Development and Implementation of an Ecological Monitoring System in the National Parks

Report
January – June, 2003

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Bulgaria Biodiversity Conservation and Economic Growth Project

is a collaborative initiative between the

United States Agency for International Development
and the
Government of the Republic of Bulgaria

implemented by
Associates in Rural Development, Inc.
Project Number LAG-I-00-99-00013-00, Task Order 01

June, 2003
Sofia, Bulgaria

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Abbreviations

ARD	Associates in Rural Development, Inc.
BAS	Bulgarian Academy of Sciences
BCEG	Biodiversity Conservation and Economic Growth Project
CBNP	Central Balkan National Park
EEA	Executive Environmental Agency
GEF	Global Environment Facility (note the acronym "GEF" is also used generically in Bulgaria for the USAID/GEF Biodiversity project)
GIS	Geographic Information System
IUCN	World Conservancy Union (formerly International Union for the Conservation of Nature)
MOEW	Ministry of Environment and Waters
NGO	Non-Government Organization
NNPS	National Nature Protection Service (of MOEW)
NP	National Park
NPD	National Park Directorate
PMU	Project Management Unit
PNP	Pirin National Park
PS	Park Section
RIEW	Regional Inspectorate of Environment and Waters
RNP	Rila National Park
USAID	United States Agency for International Development

Preface

The Biodiversity Conservation and Economic Growth (BCEG) Project is funded by the United States Agency for International Development, (USAID), as part of its strategic support to the Republic of Bulgaria. The Project is sponsored by USAID in conjunction with the Government of Bulgaria – the Ministry of Environment and Waters (MOEW). The Project is governed by a Memorandum of Understanding (MOU) between the two governments, and its implementation covers the period: May 2000 – June 2003.

This Project is a logical evolution of earlier USAID assistance to biodiversity conservation in the country. It follows some 10 years of assessment, technical assistance and financing of Bulgaria's biodiversity conservation strategic development, new protected areas legislation, and new national park institutions. The Project is designed to capitalize on the achievements of the Bulgaria Global Environmental Facility (GEF) Biodiversity Project (implemented during the period June 1995-April 2000), and builds on lessons learned.

The BCEG Project addresses six specific contract themes known as tasks or "contract result packages". The BCEG Project includes the finalization and implementation of two national park management plans, the development of a new management plan for Rila Monastery Nature Park. It assists in the development of financial mechanisms and strategies to ensure the solvency of national parks. The Project pilots economic growth activities with select target groups around two Bulgarian national parks. And it continues to build on the principles of strong public information and awareness as stepping stones for informed public engagement and promotion of biodiversity conservation and protected area management activities.

This Project is issued as a Task Order (Contract Number LAG-I-00-99-00013-00) under the USAID Global Biodiversity and Forestry Indefinite Quantities Contract (IQC); and is implemented on behalf of USAID by Associates in Rural Development, (ARD) Inc., of Burlington, Vermont, USA.

The Project is implemented through a Project Management Unit (PMU) based in Sofia, and includes a Team Leader, three Bulgarian technical specialists, and support staff. Project activities are coordinated through two mechanisms –

(a) Project Coordination Group – serves as a steering committee for Project planning and monitors implementation. This consists of the National Nature Protection Service of the MOEW, and national park directors, the PMU and USAID;
(b) Project Counterpart Team – PMU staff working with MOEW/NNPS counterparts.

The Project is largely implemented through the Directorates for Rila and Central Balkan National Parks. Additional technical assistance is provided by Bulgarian and international consultants, and is based on specific terms of reference.

Introduction

In implementation of the Rila and Central Balkan National Parks Management plans within Biodiversity Conservation and Economic Growth Project, in the beginning of 2002 efforts on development and implementation of Ecological Monitoring System have been set on.

Biodiversity monitoring is a key component of the National Strategy for Biological Diversity Conservation, as well as for Bulgaria's compliance with key EU legislation and Directives. Establishing a monitoring system is an essential requirement in National Parks Management Plans recently approved. As per Art. 50 of Protected Areas Act, National Parks Directorates should organize monitoring of the quality of environment components. In spite of the legal requirements no unified biodiversity-oriented monitoring system of environment has been developed so far in Bulgaria.

The report presents the coordinated efforts of technical experts of Rila and Central Balkan National Parks, experts from the National Nature Protection Service and Environmental Executive Agency to the Ministry of Environment and Waters, consultants of BCEG Project and members of the Project technical staff, for developing ecological monitoring system in the period January – June 2003. In the process of developing the system in 2003, Pirin National Park Directorate joined these efforts and its experts took an active part in all the stages.

The objectives of the system for ecological monitoring in the National Parks, as well as the overall concept for its development and the relevant activities during 2002, have been presented in the first report of BCEG Project: Development and Implementation of Ecological Monitoring System in the Rila and Central Balkan National Parks. In the first report are represented also national institutions that have a key role in the realization of a National Ecological Monitoring System and for the establishment of the National Ecological Network.

The present report describes briefly activities performed in the period january – june 2003 related to development and implementation of ecological monitoring system in the National Parks and the relevant results. The selected objects and regions to be monitored in each one of the parks, as well as the full text of the six monitoring methodologies elaborated with the support of BCEG Project, have been presented in the report.

Some practical recommendations and proposals for specific steps for continuation of the efforts for system implementation have been stated in the report. This is in fact the conclusive contribution of the experts and consultants of BCEG Project in developing an Ecological Monitoring System in the National Parks within the Project.

Acknowledgements

The work on the ecological monitoring system development in the National parks joint the efforts of many specialists – from the initial discussions of ideas and the concept for the overall system till the current stage of development, with identified objects and regions for monitoring in the parks and methodologies ready for use and upgrade.

We are very grateful to the experts of Rila and Central Balkan National Park Directorates, as well as to the team of Pirin National Park Directorate that joint later on, for their courage and enthusiasm to start the development of such a complex system evaluating the importance of its existence.

Central Balkan National Park - eng. Nela Ratchevits – Director; eng. Ivailo Nickolov – Deputy director, Svetoslav Todorov - Head of "Monitoring and resources conservation", Anton Stanchev – Fauna expert, Gergana Staneva – Flora expert, Gencho Iliev – GIS expert, Rumiana Ficheva – Maintenance of mountain ecosystems expert, Petya Kovacheva – Tourism expert.

Rila National Park – Mimi Pramatarova – Director; eng. Vassil Petrov – Executive director; Verka Ivanova – Forests expert, Krassimir Andonov – Fauna expert, Tatiana Maleshevska – GIS expert, eng. Rumen Kolchagov;

Pirin National Park – Georgi Grancharov - Director, Ivailo Ikonomov – Biodiversity expert, Blagoi Klecherov – Forests expert.

We are directing our special thanks to the experts of the National Nature Protection Service of the Ministry of environment and waters – Mihail Mihajlov, Ivajlo Zafirov and Rajna Hardalova – for their support, critical comments and their participation in the monitoring system development.

Acknowledgements for the efforts and involvement of the experts of the Environmental Executive Agency in the parks ecological monitoring system development – Krasimira Avramova, Ivanka Todorova and especially Madlena Pavlova. They respected the importance of the work and the key role of EEA in the development of such a system on a national level.

Special thanks we send to the specialists who developed the monitoring methodologies for the needs of the National parks and who leaded the training of the park staff in their implementation. These are Dr. Dimiter Peev – BAS, Botany institute; Dr. Georgi Kostov, Forestry Technical University; Dr. Stefan Mirchev, Forestry Technical University; Dr. Bojidar Ivanov, BAS, Zoology institute; Dr. Rajcho Gunchev; Dr. Chavdar Gusev, BAS, Botany institute; Dr. Vladimir Stefanov, Sofia University, Biology Faculty. We hope that they will continue to provide experts consultation and support to the DNPs in their work for the monitoring system implementation and development.

The driving force and leader of the process for the entire development of the ecomonitoring system for the National parks was Peter Hetz – team leader of the Biodiversity Conservation and Economic Growth Project.

1. Working meeting for development and implementation of an Ecological Monitoring System in the National Parks - 16 January 2003

On 16 of January 2003 in Park Hotel Moskva, Sofia a working meeting took place for presentation and discussion of Ecological Monitoring System elaborated by NP Rila and NP Central Balkan Directorates. 30 representatives of the National Nature Protection Service (NNPS), the Environmental Executive Agency (EEA), and of the Regional Inspectorates of Environment and Waters, as well as experts from the three National Parks, consultants from BCEG Project and the authors of methodologies for monitoring, took part in the meeting. The meeting focused on presenting an unified concept of Ecological Monitoring System in the National Parks, as well as the methodologies developed to the representatives of different institutions within MoEW in charge of observing the state of environment components and management of protected areas. The purpose of the meeting was to consider and discuss in advance the above mentioned issues within the MoEW structures.

The achievements of Rila NP and Central Balkan NP Directorates in the process of a monitoring system development focusing on biodiversity have been outlined. In spite of international and national legal requirements such a system has not been developed in Bulgaria so far. Thanks have been expressed to the American Agency for International Development for its support through BCEG Project for establishing the basis of a monitoring system, one of main directions in the efforts of NP Directorates for ensuring adaptive management of the parks. The Environmental Executive Agency expressed its satisfaction with the steps undertaken by Rila NP and Central Balkan NP, setting the beginning of fulfillment of tasks as postulated in Bulgarian legislation to be realized by the Environmental Executive Agency (EAE) and NP Directorates.

At the meeting the main problems in development and implementation of monitoring system in the National Parks have been identified:

1. Absence of leadership on the part of NNPS and/or EEA in elaborating the monitoring system.

2. The initiative for development of the monitoring system in the parks is *from bottom to top* without real guiding or coordination at national level

3. The main issue is: *Who collects the information and what kind of information?* and *Who analyses it?* - at the level of the parks for the needs of NP Directorates and at national level - EEA /MoEW, for the overall system of protected areas and the country in general.

At the meeting a consensus has been achieved for next steps in involving the Regional Inspectorates of Environment and Waters in the monitoring system implementation – collection, storage and managing information, as well as the format for final completion and presentation of proposed monitoring objects and regions in the National Parks. An Action Plan has been prepared for oncoming steps targeted at preparation and discussion of proposed system for ecological monitoring till BCEG Project completion. The program for the meeting and list of participants are presented in Appendix 1.

2. Working meeting for elaborating and implementing an Ecological Monitoring System in the National Parks, 20 February 2003, Environmental Executive Agency

On 20th of February 2003 as planned during the meeting in Park Hotel Moskva, a working meeting was held with representatives of Rila NP, Central Balkan NP and Pirin NP, experts from National Nature Protection Service and the Environmental Executive Agency as well as members of BCEG Project team. The objectives of the meeting and the list of participants, as well as a summary of its results are presented in Appendix 2.

At the meeting specific issues of NP Directorates to EEA and NNPS were discussed, as well as questions to Rila NP and Central Balkan NP for highlighting the overall concept for establishing ecological monitoring system. In Appendix 3 are stated some preliminary set issues discussed at the meeting.

It was accepted with consent that the monitoring system in the parks serves for solving practical management tasks at National Park level. The objects selected for monitoring will be included in the National Monitoring System and the information is to be submitted to EEA in an agreed form. The monitoring system should be unified for the three parks – in terms of objects, methodologies, forms for reporting, periodicity. For funding the monitoring activities, with involvement of the Regional Inspectorates of Environment and Waters/EEA, it was recommended money to be envisaged and approved within the budgets of NP Directorates.

At the meeting specific steps, persons in charge and deadlines for fulfillment of tasks were identified. Summary of the meeting and the Action Plan are presented in Appendix 2.

3. Activities of NP Directorates, EEA and Regional Inspectorates of Environment and Waters for implementing the Action Plan of the working meeting - 20 February 2003, EEA

For the period March – June 2003 representatives of NP Directorates, EEA and RIEW have continued their work for elaboration and implementation of the monitoring system in the National Parks in accordance with the Action Plan as agreed at the meeting held in EEA on 20 February 2003.

- Detailed descriptions of regions proposed for complex monitoring in each of the parks have been prepared following a preliminary set format and the matrixes with monitoring objects were completed and supplemented.

- The Directorates of the National Parks prepared information for available stations in each one of the parks for assessing quality and quantity of rainfall - Hydro-meteorological Stations, stationary points of the Bulgarian Academy of Science, etc. The information has been submitted to EEA for review so that necessary actions should be planned for ensuring rainfall data for the needs of NP Directorates.

- The monitoring methodologies developed within BCEG Project have been supplemented with requirements/conditions for ensuring the right application of the methods for obtaining reliable and authentic results.

- EEA experts have developed the format for the type and mode of annual presentation of monitoring results for monitoring objects for which methodologies have been prepared.

- With the initiative of EEA and NP Directorates, preliminary meetings of experts from NP Directorates and Regional Inspectorates of Environment and Waters took place for discussion and organizing the monitoring of selected abiotic objects in the parks – collecting samples, analysis and interpretation of results.

The results of the efforts of experts from various structures of MoEW for developing ecological monitoring system in the National Parks have been presented in the following sections of the present report.

4.   Recommendations for future development and implementation of the Monitoring System in the National Parks

In the first report devoted to the efforts for elaboration and implementation of monitoring system in Rila NP and Central Balkan NP carried out within BCEG Project, some practical recommendations for organization of Ecological monitoring system are stated. These recommendations focus on matters of primary concern that have to be realized for the system to be put into operation, for its further upgrading and successful implementation, as well as for establishing relations between the system and national institutions.

In the process of discussion of the monitoring system proposed by Rila NP and Central Balkan NP and in carrying out activities for its implementation in 2003, some additional recommendations and proposals have been identified, as follows:

1. The monitoring system has to be unified and developed for the three parks simultaneously. The elaboration of new methodologies, as well as the forms for collection, storage and exchange of information at all levels should be the same for the three parks and approved by National Nature Protection Service and EEA. The way of information collection and the objects subject to monitoring, should be the same in the degree possible, for ensuring comparability of results, while only some details in the very application of the techniques may differ, for meeting the specific conditions in each one of the parks.

2. Our suggestion is the methodologies for monitoring prepared within BCEG Project to be piloted in the parks in the next four years. During this period the park personnel will be trained to apply these methodologies, evaluate their feasibility and make improvements and changes where necessary. It would be also possible to assess specific elements of these methodologies, which would presumably require external implementing agents and/or involving short-term consultants. The pilot period will give possibility to specify the most rational volume and period for passing information on ecological monitoring from NP Directorates to EEA and the National Nature Protection Service. After applying these methodologies during the four-year pilot period, the improved methodologies are to be approved by MoEW as official documents guiding the monitoring of biodiversity in the parks.

3. The system for monitoring should be presented and discussed with other partners of NP Directorates and MoEW as well, e.g. Ministry of Agriculture and Forests and its regional and local bodies, Bulgarian an international research institutions, NGOs, private companies, etc. The aim is other institutions responsible in carrying out monitoring activities in the protected areas such as the National Forestry Board, Nature Parks Directorates, scientific institutions, Universities, etc. to be informed and involved as well. Including different partners of the parks in the monitoring system development is necessary for the discussion and finalization of the methodology for monitoring the tourism impact as well as for the development of the methodologies for the other selected objects.

4. Special attention should be paid for identification and application of mechanisms for attracting partners for implementing separate components of the monitoring system, especially higher educational institutions, research institutes and specialized NGOs.

5. The efforts for further development of the monitoring system should continue with priority to the elaboration and application of a methodology for assessment of tourist flow, as well as discussion and further improvement of the methodology of tourist impact with a view of identifying the limits of acceptable change and carrying capacity of various parts of the parks. The experts of NP Directorates pointed as priority tasks the completion and/or elaboration of monitoring methodologies for large mammals (wild goat, noble deer and wolf) followed by developing a monitoring methodology for plant species of conservation value in each one of the parks.

6. The experts of National Park Directorates in preparing their annual reports for monitoring activities in the parks should assess the results in terms of achieving the ideal and operation goals of the Management Plan, which is in fact the framework of the Ecological monitoring system in the Park. Summarizing annual reports will facilitate the overall assessment of the Management Plan implementation and its efficiency at the end of a ten-year operation period.

7. Under the leadership of EEA and NNPS, the experience gained in the elaboration and implementation of an eco-monitoring system in the National Parks should be used for introducing and implementing a National Bio-diversity Monitoring System and especially in the National Ecological Network. Last but not least, while developing such a system, it is important to provide it with contemporary means for storage and processing of information – GIS, specialized data base, etc.

8. EEA and NNPS have to prepare an agreement between the interested bodies in the MOEW for coordination of the monitoring activities in the National Parks according to the laws and regulations. It includes roles and responsibilities of the different bodies – NPD, RIEW, NNPS, EEA, mechanisms for long term financing of the monitoring activities as well as the mechanisms of sharing, storage and use of the collected information.

5.   Regions selected for complex ecological monitoring in the National Parks

5.1   Description of the regions subject to complex monitoring in the territory of Rila NP

The Seven Lakes Region

1. Region Name: The Seven Lakes

2. Park Sections: Dupnitsa and Govedartsi PS.

3. Description of the territory:

    3.1.   Area – 1685 hectares;

    3.2.   From Vada chalet along the path to Lovna chalet, along the park border, along the path to Skakavitsa chalet, through Skakavishki Waterfalls, along the Kabulska River, along the path through Otovishki Peak to Ivan Vazov chalet, along the path to Vazov Peak (Damga Peak), to the Panitsata Lake and from there – along the path to Vada chalet.

4. Access to the region: from the Panichishte Visitors' Center by the road to Pionerska chalet along the path to the 7 Lakes, from Zeleni Preslap to Skakavitsa chalet to the Seven Lakes, along the path to Lovna chalet and to the Seven Lakes, from Lovna chalet along Kyumyurdjiiska path to the Seven Lakes, from Vada chalet through Lovna chalet and along the path to Ivan Vazov chalet and to the Seven Lakes, from Samoranovo village along the path to the Otovitsa chalet and along the path to Ivan Vazov chalet to the 7 Lakes.

5. Ecological Description:

    5.1.   Forest ecosystems (coniferous belt –unique for the site; endemic Macedonian pine; dwarf-pine zone) and alpine ecosystems;

    5.2.   Flora of high conservation value (20 rare and 2 endangered species) the Rila primrose, yellow gentian; crowberry, etc.

    5.3.   Fauna - Characteristic animal habitats of alpine ecosystems, providing living conditions for the species, subject to the monitoring in the region.

    5.4.   Habitats - Complex habitats of mountain and high-mountain type, comprising mostly lake, river, alpine and sub-alpine habitats. Rila-Pirin type of Macedonian pine forests prevails among forest habitats.

6. Assessment of region's significance and existing threats:

    -    The region is representative of the northwestern part of the park territory, featuring a large number of water sites (The Seven Rila Lakes – a symbol of Rila).

    -    Disturbance of the animal species inhabiting the region, erosion; grazing of domestic animals.

- The region is strongly affected by the anthropogenic impact; erosion has been caused by domestic animals (horses.)

7. Justification for the region selection in view of its representativeness:

To the north-east - *forests (Macedonian pine); alpine ecosystems;* a model region for *tourist pressure* allowing for comparison with other regions in the park; *lake and by-lake habitats,* trout fishes, newt, tree toad, falcon; grazing of domestic animals; *a region featuring the highest degree of eroded paths.*

8. Zones represented in the region:

   - intensive tourism zone,

   - limited human impact zone,

   - multi-functional zone.

Musala Peak Region

1. Region Name: Musala Peak

2. Park Sections: Borovets PS and Beli Iskar PS

3. Description of the territory:

   3.1. Area– 2212 hectares;

   3.2. From Musala chalet along the path to Yastrebets, to the park border, from the lift along the border of Central Rila Reserve to the road to Beli Iskar reservoir along the road to Darkev Dol, along Darkev Dol to Marishki Peak, along the border of the Reserve (park) to Mancho Peak, along the ridge east of Marishki Cirque to the Golema Maritsa River, east of the Dark Lake, by Sphinx to Musala chalet.

4. Access to the region: via the paths from Borovets resort village – Yastrebets chalet – Musala chalet;

5. Ecological Description:

   5.1. Forest ecosystems: coniferous belt - a model region of forests, having been managed for almost one hundred years in observance of all principles of the forest management practice, allowing for comparisons with forests, where no extraction activities have been carried out; dwarf-pine zone; high-mountain ecosystems and treeles alpine belt, characteristic animal habitats (of the species, subject to monitoring)

   5.2. Flora: of high conservation significance rose-root, small flower pink - Balkan endemic, etc.;

   5.3. Fauna: the region provides characteristic habitats for optimum living conditions of wild animals' populations, nesting, wintering and hiding sites and complete isolation from the impact of the anthropogenic pressence.

   5.4. Habitats: Complex habitats of the mountain and high-mountain type, comprising mostly lake, river, alpine and sub-alpine habitats.

> Prevailing among the forest type of habitats are Central Rila-Rhodopes spruce forests.

6. Assessment of region's significance and existing threats:

   - Forests – a region representative of the northern part of the park territory, with the highest peak on the Balkan Peninsula.

   - Threat – great tourist flow, disturbance of the animal species inhabiting the region.

7. Justification for the region selection in view of its representativeness:

Forests, characteristic for the northern part of the park territory (an opportunity for long-term observation of the impact of the anthropogenic impact – a great number of water catchments along the Beli Iskar River; eroded tourist paths along the whole E 4, impact of grazing in the area of Zavrachitsa, an opportunity for observation of the occurrence of drying among the spruce and fir species; after-fire succession after the fire in 1993; non-indigenous species – common larch and adaptation trends); high-mountain ecosystems, *abiotic factors; Flora of high conservation significance –* rose-root, small flower pink-Balkan endemic and other; *Fauna* **-** monitoring of the following animal species can be carried out in the zone of the Central Rila Reserve, as the region provides *typical habitats of nesting, wintering and hiding sites and complete isolation from the impact of the anthropogenic factor*: wild goat, bear, red deer, deer, wolf, imperial eagle, falcon, trout, alpine newt, wood grouse, hazel-hen.

8. Zones represented in the region:

   - Reserves, intensive tourism zone,

   - limited human impact zone,

   - multi-functional zone,

   - infrastructure zone.

Parangalitsa Region

1. Region Name: Parangalitsa

2. Park Section: Blagoevgrad PS.

3. Description of the territory:

   3.1. Area -1540 hectares;

   3.2. From Kartalska Polyana along the path through Kriviya Uluk to elevation 2000 (to the dwarf-pine), through the Haidushka River, the Golyama Parangalitsa River, the Malka Parangalitsa River, to the path under German Peak, north of Makedonia chalet, along the northwest path to Dobro Pole, to the ridge of Arizmanitsa Peak, along the ridge to Kartalska Polyana.

4. Access to the region: from Blagoevgrad.

5. Ecological Description:

   5.1. Forests: natural spruce forests (representative of the species.)

  5.2. Fauna: The region provides conditions for the optimum development of the populations of the animal species, subject of the monitoring.

  5.3. Flora:

  5.4. Habitats: Mostly complex habitats of sub-alpine type and natural spruce forests.

6. Assessment of region's significance and existing threats:

 - a region representative of preserved natural ecosystems, a model region,

 - threats – possible occurrence of fire is the only existing threat.

7. Justification for the region selection in view of its representativeness:

Abiotic objects, forests (natural spruce forests, Reserve territory, a region allowing for comparison with other territories, where felling and forest activities have been carried out, different institutes store extensive information about the region, which can be used for the needs of the monitoring (a transect has been developed following the methodology for forest monitoring and the first pilot test-area has been completed).

The region is appropriate for monitoring of animal species and provides typical habitats for nesting, wintering and hiding sites in complete isolation from the impact of human beings; species: bear, red deer, deer, wolf, imperial eagle, falcon, wood grouse, hazel-hen, viviparous lizard, trout.

8. Zones represented in the region: Reserves, intensive tourism zone, limited human impact zone.

Malyovitsa Region

1. Region Name: Malyovitsa

2. Park Sections: Govedartsi.

3. Description of the territory:

  3.1. Area - 1982 hectares;

  3.2. From Malyovitsa resort complex along the park border (the region of Yavorova Polyana) along the path to Chernata Skala, along the Malka Urdina River to the park border, along the border to the Rimski Drum [Roman Road] through the Yonchevo Lake, along the path to the Dolna Preka River, along the park border to Malyovitsa resort complex.

4. Access to the region: from the village of Govedartsi.

5. Ecological Description:

  5.1. Forest ecosystems (coniferous belt), dwarf-pine zone – after-fire succession,

  5.2. Flora: high-mountain ecosystems,

  5.3. Fauna: characteristic habitats of represented fauna species (subject to monitoring), rock habitats,

  5.4. Tourist flow

  5.5. Habitats: Complex habitats of the mountain and high-mountain type, comprising lake, river, alpine and sub-alpine habitats, mixed spruce-fir – Scots pine forests, dwarf-pine formations.

6. Assessment of region's significance and existing threats:

- A region representative of the northern part of the park territory (forests - Scots pine, fir, spruce), dwarf-pine zone with after-fire succession; localities of flora of high conservation significance.

- Threats – disturbance of the animal species inhabiting the region; erosion; rock habitats affected by the large number of sportsmen (rocks-climbers). A real threat is the contamination of the river and the adjacent mezophyllic meadows with sewage waters from Malyovitsa chalet.

7. Justification for the region selection in view of its representativeness:

Abiota, forests, tourist flow, rock habitats, after-fire succession, flora of high conservation significance, for example: rose-root, Rila primrose, Balkan endemic – Bulgarian gentian, colorful saxifrage -Bulgarian endemic; important habitats for the fauna species, nesting, wintering, hiding and breeding sites: bear, deer, wolf, imperial eagle, falcon, wood grouse, hazel-hen, alpine newt, viviparous lizard, trout.

8. Zones represented in the region: Reserves, intensive tourism zone, limited human impact zone, multi-functional zone, infrastructure zone.

Granchar Chalet Region

1. Region Name: Granchar chalet

2. Park Section: Yakoruda PS.

3. Description of the territory:

  3.1. Area- 1707 hectares;

  3.2. From Djanka Peak along the path to Granchar chalet, along the road to Nehtenitsa, from there – along the road through Ropalitsa to the Yanchova River, along the river to Yanchov peak to the north, then west along the border of the park section to Djanka Peak.

4. Access to the region: by the road from Treshtenik resort complex; from Bela Mesta by the Ropalishki road.

5. Ecological Description:

  5.1. Coniferous forests, representative of the southern part of the park,

  5.2. Bilberry resources of economic value,

  5.3. Characteristic habitats of fauna representatives (of the species, subject to monitoring),

  5.4. Tourist flow,

  5.5. Lake and by-lake habitats

Habitats: Complex habitats of mountain and high-mountain type, comprising lake, river, alpine and sub-alpine habitats and spruce – Scots pine – white fir forests and communities of bilberry.

6. Assessment of region's significance and existing threats:

   - Bilberry resources of economic value; rocky habitats, great species diversity of diurnal birds of prey and fowl birds, large mammals.

   - Threats – the use of bilberry fruits may exceed the exploitation resources if not controlled (the impact of the derivation on forest ecosystems; tourist flow)

7. Justification for the region selection in view of its representativeness:

Tourist flow, abiota, dwarf-pine formations, bilberry Campaign 2002 – follow-up of the BCEG Project of 2001: sample plots were developed, a phenological report of the development phases was made, and an assessment of the resources of the bilberries, including a projection of the exploitation reserve was carried out, an experimental coupon system for bilberries collection was introduced);

Fauna: bear, deer, wolf, imperial eagle, falcon, wood grouse, hazel-hen, viviparous lizard, alpine newt, trout.

8. Zones represented in the region: intensive tourism zone, limited human impact zone, multi-functional zone, infrastructure zone.

Belmeken Region

1. Region Name: Belmeken

2. Park Sections: Belovo PS and Yakoruda PS.

3. Description of the territory:

   3.1. Area – 2310 hectares;

   3.2. From the wall of Belmeken reservoir along the road to Pomochena Polyana, along the border of Belovo Park Section, on the west to the path for Sofan Peak, and from there, along the path to Kardalitsa, along the border to the wall of Belmeken reservoir.

4. Access to the region: from Belovo and from Yundola, from Cherna Mesta (through Leeve).

5. Ecological Description:

   5.1. Coniferous forests; high-mountain meadows and grazing lands.

   5.2. Fauna - the only habitat of the rare and endemic sub-species of the souslik (Spermophilus citellus martinoi), the region provides optimum conditions for development of its population. The territory represents natural hunting habitats of diurnal birds of prey.

   5.3. Flora – characteristic habitats of protected flora species (Bulgarian avens and others).

5.4.   Habitats: Complex habitats of the mountain and high-mountain type, comprising alpine and sub-alpine habitats, mostly never-drying lakes and dams, spruce forests and dwarf-pine formations.

6.   Assessment of region's significance and existing threats:

Forests- a region representative of the southeastern part of the park territory; environmental assessment of the facilities built; local population of the souslik. Threat – disturbance of the animal species inhabiting the region.

7.   Justification for the region selection in view of its representativeness:

-   *Forests* – a region representative of the eastern part of the park territory (a transect with test areas has been set up; commercial timber use activities were carried out in the past – in the lower parts of the transect),

-   Tourist flow, buildings and facilities (the derivation);

-   Fauna: all diurnal birds of prey, *souslik – observed only in this region*, viviparous lizard, bear, wild goat, deer, wolf, imperial eagle, falcon, trout, wood grouse, hazel-hen.

8.   Zones represented in the region: intensive tourism zone, mutli-functional zone, infrastructure zone.

Semkovo Region

1.   Name: Semkovo

2.   Park Section: Belitsa PS

3.   Description of the territory:

3.1.   Area-1252 hectares;

3.2.   From Semkovo resort complex along the Vapska River to Vapski Lakes, by the Vapski Cirque, along the ridge by the path through Vapa Peak to Gorni Kuki area, along the path to the Suhoto Lake, along the ravine of the Polenitsa River to the park border, along the park border to Semkovo resort complex.

4.   Access to the region: from Belitsa.

5.   Ecological Description:

5.1.   Forest ecosystems (spruce; white fir, Macedonian pine, Scots pine)

5.2.   Fauna: large number and density of all fauna species represented in the park.

5.3.   Flora: protected flora species.

5.4.   Habitats: Complex habitats of spruce – Scots pine – Macedonian pine forests, dwarf-pine formations, communities of bilberries, rock, lake, by-lake and river habitats.

6.   Assessment of region's significance and existing threats:

A region representative of the southern part of the park, featuring high tourist flow, wastewater infrastructure for buildings and facilities, unregulated collection of mushrooms, bilberry, grazing.

7. Justification for the region selection in view of its representativeness:

- *Forests* (spruce, Scots pine and Macedonian pine),

- Tourist flow, buildings and facilities; bilberry and mushrooms;

- One of the richest regions in fauna species: Tengmalm's owl, viviparous lizard, bear, chamois, red deer, deer, wolf, trout; in this region the fowl birds population are high in number and density: wood grouse, *hazel-hen* (the transect for monitoring of the hazel-hen is defined outside the region of Semkovo).

- Habitats of protected representatives of the flora (rose-root, Bulgarian avens).

8. Zones represented in the region: intensive tourism zone, limited human impact zone, multi-functional zone, infrastructure zone.

5.2 Description of the regions subject to complex monitoring in the territory of Central Balkan NP

Vezhen Region

1. Name: Vezhen

2. Park section: comprises a part of Teteven PS

3. Description of the territory:

   3.1. Topographic borders: to the north the NP border, to the south the main ridge of Stara planina mountain, to the west the water shed between the water catchments of the Cherni and the Beli Vit rivers; to the east the ridge of Kukui,

   3.2. Localities: the Dalbokoto Dere, Kodzhaiurt, Bulovanya, Hanovete, Bolovandzhika, Trite dola. Subordinated additional areas: Ostrikata site, dwarf-pine population above Boatin reserve, Vartopa.

4. Access to the region: by the roads Ribaritsa – Bulovanya, Ribaritsa – Dalbokoto Dere, Ribaritsa – Trite dola

5. Ecological description:

   Beach and hornbeam, beach, beach and fir, a belt of coniferous, alpine and sub-alpine grass and shrub communities;

6. Assessment of region's significance and existing threats:

- medium;

- the main threats – tree felling in the areas surrounding the park.

- trends – the number of domestic grazing areas is going down.

7. Reasons for selecting the region in view of its representativeness:

One of the regions where the forests of northern Stara planina are fully represented, including nearly all vegetation belts. Concrete objects selected - Transect 1 for monitoring of forests, sample plot for juniper monitoring. The region represents all zones and provides for all types of traditional and allowed usage in accordance with the NP`s management plan. A region suitable for monitoring on the impact of grazing and fires on communities in the forest-free zone. In this region, it can also be observed a well defined increase in the tree line of the forest resulting from the applied restrictive regime in Tsarichina Reserve. There are several traditionaly used regions /refugees for reproduction of bears and wolves, mating sites for the Red Deer, for some years now there is an isolated habitat of chamois.

8. List the zones represented in the region: reserves - Tsarichina, major tourist routes: Ribaritsa – Vezhen, Benkovski, Echo, Limited Human Impact zone – Ushite and Hanovete localities.

Beklemeto Region

1. Name: Beklemeto

2. Park section/s: Troyan PS, Karlovo PS, Klisura PS

3. Description of the territory:

   3.1. Topographic borders: to the east: Kumanitsa ridge, to the west: Pass of Troyan, to the north and south: the borders of NP

   3.2. Localities: Steneto, Kumanitsa, Tabiite, Vlashki mandri, Kodzhadere, Dzhafar dere, Chamlaka etc. Subordinated additional areas: Kozia stena, Korfiata, Kodzha dere.

4. Access to the region: through the pass Troyan – Karanre, by the roads of Beklemeto (the monument) – Dobrila, tourist settlement Beklemeto – Chuchul chalet, Zhalna – Sivriata, Lepenyat - Chuchul.

5. Ecological description:

   Beach, beach and fir, spruce and mixed deciduous forests, shrub and grass communities, rock and rock-forest combinations,

6. Assessment of region's significance and existing threats:

The highest conservation significance, serious threats from poachers, treasure- hunters, etc. human activities due to the easy access and tradition to use the resources in the region (herbs, wild berries, wood, game, grazing, wild flowers).

7. Reasons for selecting the region in view of its representativeness:

Transect No 2 for forest monitoring has been set up in the region, and there is also sample plot for monitoring of juniper and invertebrates, a number of other studies have also been carried out. A Forest monitoring station is located in the region (Zhalna station of the Forest Institute at the Bulgarian Academy of Sciences), some facilities for measuring of precipitation are also available (Zhalna, the Beklemeto pass, Dermenka chalet). One of the most appropriate regions for monitoring of birds, invertebrates, and rare plants. In recent years the number of the most important large mammals has decreased (chamois, bear, red deer) due to human impact. One of the two main regions for plant and bird monitoring, and also for the impact of the tourists flow.

8. List the zones represented in the region: All zones in the NP are well represented in the region – Steneto reserve, Limited human impact zone – Zhalna, Korfya localities, the main tourist routes pass through Dermenka chalet to Karnare town, Dobrila chalet, Beklemeto, Cherni Osam village etc.

9. Other: The Region is extremely important for conservation of biodiversity, while being easily accessible, highly visited and very vulnerable. It can be claimed that currently that is *the most important region for the National park in terms of biodiversity conservation and human impact.*

Tazhansko zhdrelo Region

1. Name: Tazhansko zhdrelo

2. Park sections: includes Tazha PS and Kalofer PS

3. Description:

    3.1. Topographic borders: to the east the line Rosovatets – Golyam kademlia – Svetitsa medow, to the west: Yurushka gramada – Teleshkata glava – Hydro-power station Tazha, to the north – the main Stara planina ridge, to the south: NP borders

    3.2. Localities: Rusaliite, Tazhansko zhdrelo.

4. Access to the region: through the Rusaliiski pass, by the road Kalofer – Botev, the road to mount Triglav.

5. Ecological description:

    Forests – beach, beach mixed with fir, mixed coniferous including of artificial and secondary natural origin. Grass and shrub communities typical of the forest sub-alpine and alpine belt. Gorges, rocks, rock-and-grass and rock and forest complexes.

6. Assessment of region's significance and existing threats

High significance, threats refer mainly large grazing animals and the bear.

7. Reasons for selecting the region in view of its representativeness:

The most representative region for the bear and the wolf, but also representative of a number of unique habitats of rare species and communities. Transect No 3 for forest monitoring, one of the two main regions for monitoring of birds and rare plants. The facilities existing on site – Tazha chalet, Triglav complex, Sladkata voda check point – may serve as a base camps for monitoring activities.

8. List the zones represented in the region: All zones are represented, Dzhendema Reserve, Limited human impact zone Kademliisko praskalo,

Botev Region

1. Name: Botev region

2. Park sections: Kalofer PS and Stokite PS

3. Description:

Topographic borders: The region covers mount Botev with the following borders – north: the forest timber line, east – Marinka saddle and the beginning of the Bazovitsa river, south – the forest timber line, west - Chufadaritsa – Diuza – Diuzchal – Peshta.

Localities: Ravnets, Belchu, Severen Dzhendem, Haiduta, Kafadikildi, Vodnite dupki, Yumruka and Malkia Yumruk, Raiskite skali, the Goliama Bazovitsa valley.

3.   Ecological description:

Includes treeless zone **–** sub alpine and alpine belts; rock formations.

4.   Assessment of region's significance and existing threats

High significance; the region is impacted by human presence – Botev station, Rai chalet – (currently the most visited chalet in CBNP), routes Rai (to chalets Levski, Botev, Pleven, and the town of Kalofer) and Pleven (Botev, Rai, Levski, Tazha chalets) grazing in the region, etc.

5.   Reasons for selecting the region in view of its representativeness:

Its purpose is to allow for monitoring of the highest parts of the mountain, where species typical of the alpine biome are to be found, and also to observe the status of species formation hot spots (most of them fall in the region). Its selection as a monitoring region is needed since it is one of the most representative regions for the alpine zone of Stara planina mountain.

6.   List the zones represented in the region: reserves Severen and Yujen Djendem; limited human impact zone, tourist zone, infrastructure zone.

5.3   Description of the regions subject to complex monitoring in the territory of Pirin NP

Banderishki Cirque Region

1.   Region Name: Banderishki Cirque

2.   Park sections: Vihren PS.

3.   Description of the territory:

    3.1.   Area – 725 hectares;

    3.2.   From Banderitsa chalet by the road to Vihren chalet, through Ravnako locality to Banderishki Ezera, Donchovi Karauli, Banderishka Porta by the path to Vihren chalet through Premkata to Kazana shelter and Banderitsa chalet.

4.   Access to region: from the town of Bansko by the road to Banderitsa chalet.

5.   Ecological description:

    5.1.   Forest ecosystems (coniferous belt – a unique feature of the region; endemic Macedonian pine; dwarf-pine zone and high-mountain ecosystems);

5.2.   Flora of high conservation value, presence of endemic species (Bunderitca Lady`s mantle, edelweiss, Pirin thyme, etc.)

5.3.   Fauna

Typical animal habitats of alpine ecosystems, providing living conditions for the species, subject to monitoring in this region.

5.4.   Habitats: Complex habitats of mountain and high-mountain type, comprising mostly lake, river, alpine and sub-alpine habitats.

6.   Assessment of region's significance and existing threats

- A region representative of the central part of the park, featuring a large number of water sites (Banderishki Ezera (lakes).

- Disturbance of the animal species inhabiting the region and erosion around Baikusheva Mura (natural monument thousand years old Macedonian pine tree). The second highest peak in Bulgaria with a substantial presence of tourists in the region. The rock habitats are affected by a large number of mountaineers/climbers. The Banderishka River is contaminated with domestic sewage waters from Vihren and Banderitsa chalets presents, which is a real threat.

7.   Reasons for selecting the region in view of its representativeness:

High-mountain ecosystems; a model region for intensive tourist flow allowing for comparison with other park regions; lake and by-lake habitats, trout species, chamois; a region featuring the highest degree of eroded trails.

8.   Zones represented in the region:

Region – Ski zone

1.   Region Name: Todorka Peak – Shiligarnika locality – Banderishka Polyana – Echimene locality.

2.   Park sections: Vihren PS

3.   Description of the territory:

3.1.   Area – 615 hectares;

3.2.   From Todorka Peak to Platoto locality to Karkamski Cirque to Ikrishka Polyana, Shiligarnika, Banderishka Polyana and Echimene locality.

4.   Access to the region: from the town of Bansko by the road to Ski Zone - Shiligarnika.

5.   Ecological description:

5.1.   Forest ecosystems: coniferous belt, dwarf-pine zone; high-mountain ecosystems and a treeless alpine belt, characteristic animal habitats (of the species, subject to monitoring)

5.2.   Flora: of high conservation value yellow gentian, spotted gentian, Urumov oxytropis, etc.;

5.3.   Fauna: the region provides characteristic habitats for optimum development of the wild animals populations such as nesting, wintering, and hiding places.

5.4.   Habitats: Complex habitats of mountain and high-mountain type, comprising mostly lake, river, alpine and sub-alpine habitats. The forest habitat type is dominated by Macedonian pine - spruce and fir forests.

6.   Assessment of region's significance and existing threats: a region featuring the highest tourist flow, erosion, threats by pollution with domestic sewage waters, and disturbance of the animal species inhabiting the region.

7.   Reasons for selecting the region in view of its representative value: forests, characteristic of this part of the park (an opportunity for long-term observation of the impact of the anthropogenic pressure in the Shiligarnika ski zone; eroded tourist paths; high-mountain ecosystems, abiotic factors; flora of high conservation significance; fauna – monitoring of the following animal species should be carried out – chamois, bear, trout, wood grouse.

8.   Zones represented in the region: a zone for intensive tourism, a multi-functional zone, buildings and facilities zone.

Popovoezeren Cirque and part of Yulen Reserve

1.   Region Name: Popovoezeren Cirque and part of Yulen Reserve

2.   Park section: Bezbog PS.

3.   Description of the territory:

3.1.   Area-460 hectares;

3.2.   From Bezbog chalet along the path to Popovo Lake, to Djangalska Porta along the path to Prevalski Cirque, through Tiatsite for Demyanitsa chalet.

4.   Access to the region: from Dobrinishte village – Gotse Delchev chalet, Bezbog chalet; from the town of Bansko – Demyanitsa chalet

5.   Ecological description:

5.1.   Forests: natural Macedonian pine forests

5.2.   Fauna: The region provides conditions for optimum development of the populations of the animal species, subject to monitoring. Typical representatives are the brown bear, wolf, chamois, Balkan trout, etc.

5.3.   Flora: Major representatives – globe flower, anemone, species from the Ice Age can be observed – crowberry and others.

5.4.   Habitats: Complex habitats of sub-alpine type and natural Macedonian pine forests.

6.   Assessment of region's significance and existing threats: a region representative of preserved natural ecosystems, ancient forests, individual ancient trees of Pinus cheildraichii.

Threats – possible occurrence of fire is the only threat.

7.   Reasons for selecting the region in view of its representative value: abiota, forests (natural Macedonian pine forests, Reserve)

The region of the Yulen Reserve is appropriate for monitoring of animal species and provides characteristic habitats such as nesting, wintering, and hiding sites and complete isolation from the impact of men; species: bear, wolf, imperial eagle, falcon, wood grouse, trout.

8.   Zones represented in the region: Reserves , zone for intensive tourism, zone of limited human impact.

Bayuvi Dupki Cirque Region –Bayuvi Dupki-Djindiritsa Reserve

1.   Region Name: Bayuvi Dupki-Djindiritsa

2.   Park sections: –Bayuvi Dupki-Djindiritsa

3.   Description of the territory:

    3.1.   Area-2873 hectares;

    3.2.   Situated between the Pirin and Banski Suhodol peaks, includes the cirques Bayuvi Dupki, Razlojki Suhodol, Kamenititsa, Okaden Peak, Segmen hillock, Dautov Peak, Konyarnika locality and the Byala River valley.

4.   Access to the region: from the town of Razlog – Yavorov chalet; from the Predela locality, via international route E4

5.   Ecological description:

    5.1.   Forest ecosystems of endemic Macedonian pine forests, old Austrian pine forests, Pinus cheildrachii forests, dwarf-pine zone.

    5.2.   Flora: the following species can be observed : globe flower, anemone, yellow and spotted butterwort, Pirin fescue, alpine lady-fern, geranium species, etc.

    5.3.   Fauna: The region provides conditions for the optimum development of the populations of the animal species, subject to monitoring. Typical representatives are the brown bear, wolf, chamois, imperial eagle, wood grouse, hazel hen, falcon, Balkan trout, etc.

    5.4.   Tourist flow – educational tours led by an experienced guide, along marked routes observing a prescribed regime.

    5.5.   Habitats: Complex habitats of mountain and high-mountain type, comprising lake, river, alpine and sub-alpine habitats, Macedonian pine forests, Austrian pine forests, dwarf-pine formations.

6.   Assessment of region's significance and existing threats:

A region representative of the park territory, flora habitats of high conservation significance.

7.   Reasons for selecting the region in view of its representative value:

abiota, forests (natural pine forests, Reserve territory)

The region of the Byuvi Dupki-Djindjiritsa Reserve is appropriate for monitoring of animal species, providing typical habitats including nesting, wintering and hiding sites and complete isolation from human impact; species: bear, wolf, imperial eagle, falcon, wood grouse, trout.

8. Zones represented in the region: Reserves, zone of limited human impact.

Spanopolski and Bashliiski Cirque Region

1. Region Name: Spanopolski and Bashliiski Cirque

2. Park Section: Kamenitsa PS.

3. Description of the territory:

   3.1. Area - 950 hectares;

   3.2. From Begovitsa chalet, the path to the Vinarska Porta and to Sinanishka Porta includes Malko and Golyamo Spano Pole, the Malka spoanopolska and Bashliiska riverbed and Bashliiski Cirque.

4. Access to the region: from Begovitsa chalet; Yane Sandanski chalet.

5. Ecological description:

   5.1. Forest ecosystems (grazing section, coniferous belt – a unique feature of the region; endemic Macedonian pine, dwarf-pine zone and high-mountain ecosystems);

   5.2. Flora of high conservation value, presence of endemic species (Bunderitsa Lady`s mantle, edelweiss, Pirin thyme, etc.)

   5.3. Fauna

   Typical animal habitats of alpine ecosystems, providing conditions for development of the species, subject to monitoring in this region.

   5.4. Habitats: Complex habitats of mountain and high-mountain type, comprising mostly lake, river, alpine and sub-alpine habitats.

6. Assessment of region's significance and existing threats:

   - Localities of commercially valuable resources; rock habitats, wide species diversity of diurnal birds of prey and fowl birds, large mammals.

   - Threats – disturbance of the animal species inhabiting the region and erosion, caused by grazing domestic animals. A region affected by men.

7. Reasons for selecting the region in view of its representative value:

   High-mountain ecosystems; a model region of tourist flow providing opportunity for comparison with other park regions; lake and by-lake habitats, trout fishes, chamois; a region featuring the highest degree of eroded paths.

8. Zones represented in the region: zone for intensive tourism, zone of limited human impact, multi-functional zone.

Vlahinski and Georgiiski Cirque Region

1. Region Name: Vlahinski and Georgiiski Cirque

2. Park Sections: Sinanitsa PS

3. Description of the territory:

    3.1. Area – 730 hectares;

    3.2. From the Sinite Kamani locality along the path to Sinanishka Porta along the path to Banderishka Porta, Vlahinski Preval, along the stream of Vlahinska River and back to the Sinite Kamani locality.

4. Access to the region: from the town of Kresna by the road to the Sinite Kamani locality.

5. Ecological description:

    5.1. Coniferous forests; high-mountain meadows and grazing fields.

    5.2. Fauna: The region provides conditions for the optimum development of the populations of the animal species, subject to monitoring. Typical representatives are the brown bear, wolf, chamois, imperial eagle, wood grouse, hazel-hen, falcon, Balkan trout, etc.

    5.3. Flora – typical habitats of protected flora species

    5.4. Habitats: Complex habitats of mountain and high-mountain type, comprising alpine and sub-alpine habitats in their largest part; lakes, forests and dwarf-pine formations.

6. Assessment of region's significance and existing threats : forests - a region representative of the park territory featuring a large number of water sites (Vlahinski Ezera, Gergiinski Ezera);

    Threat - disturbance of the animal species inhabiting the region.

7. Reasons for selecting the region in view of its representative value:

    The region is appropriate for monitoring of animal species and provides typical habitats, including nesting, wintering and hiding sites and complete isolation from the impact of men; species: bear, wolf, chamois, imperial eagle, falcon, wood grouse, trout.

8. Zones represented in the region: a zone for intensive tourism; other zones according to the particular conditions.

6. List of the selected objects for monitoring in the National Parks

ABIOTIC OBJECTS
1. Soils
2. Precipitation
3. Quality of waters - rivers
4. Quality of waters - lakes

BIOTIC OBJECTS
5. Forests

Animal species

Large mammals
6. Chamois (*Rupicapra rupicapra balcanica*)
7. Deer (*Cervus elaphus*)
8. Bear (*Ursus arctos*)
9. Wolf (*Canis lupus*)

Small mammals
10. Souslik (*Spermophilus citellus*)

Diurnal birds of pray
11. Short-toed Eagle (*Circaetus gallicus)*
12. Long-legged Buzzard (*Buteo rufinus)*
13. Golden Eagle (*Aquila chrysaetos)*
14. Saker Falcon (*Falco cherrug)*
15. Peregrine Falcon (*Falco peregrinus)*
16. Imperial Eagle (*Aquila heliaca)*

Nocturnal birds of pray
17. Tengmalm's Owl (*Aegolius funereus*)
18. Eagle Owl (*Bubo bubo)*
19. Pygmy Owl (*Glaucidium passerinum)*
20. Ural Owl (*Strix uralensis)*

Forests birds
21. Hazel Grouse (*Bonasa bonasia)*
22. Capercaillie (*Tetrao urogallus)*
23. Rock Partridge (*Alectoris graeca)*
24. White-backed Woodpecker (*Picoides leucotos)*

Rocky habitats birds
25. Wallcreeper (*Tichodroma muraria)*
26. Yellow-billed Chough (*Pyrrhocorax graculus)*

Fish
27. Balkan trout (*Salmo trutta-morfa fario*)

Amphibians and Reptiles
28. Alpine newt (*Triturus alpestris*)
29. Viviparous lizard (*Lacerta vivipara*)
30. European tree frog (*Hyla arborea*)

Invertebrates

Plants

Conservationally significant species
31. Rose root (*Rhodiola rosea* L.)
32. Yellow gentian (*Gentiana lutea* L.)
33. Spotted gentian (*G. punctata* L.)
34. Rila rhubarb (*Rheum rhaponicum* L.)
35. Iris (*Iris reichenbachii* Heuff.)
36. Edelweiss (*Leontopodum alpinum* Cass.)
37. Balkan campion (*Silene balcanica* (Urum.) Hay.*)*
38. Yellow lily (*Lilium jankae* Kern)
39. Rhododendron (*Rhododendron myrtiphlium* Schott et Kotschy)
40. Blagaev`s spurge (*Daphne blagayana* Freyer*)*
41. Sundew (*Drosera rotundifolia* L.)
42. Balkan primrose (*Primula frondosa* Janka*)*
43. Vihren`s erigeron (*Erigeron uniflorus L. ssp. Vichreusus* (Pawl.) Koz. et Andr.)
44. Banderica Lady`s mantle (*Alchemilla bandericensis* Pawl.)
45. Pirin poppy (*Papaver degenii* (Urum. et Jav.) Kuzm.*)*
46. Pirin hogweed (*Heracleum angustisectum* (Stoj. Et Acht.) Peev)
47. Stefan`s hawkweed (*Hieracium* stefanoffii (Zahn))
48. Pirin`s thyme (*Thymus perinicus* (vel.) Jalas)
49. Uromov`s oxytropis (*Oxytropis urumovii* Jav.*)*

Medicinal plants – commercially used
50. Bilberry (*Vaccinium myrtillus* L.)

Tourism

51. Tourism flow
52. Tourism impact

Plant communities, successions

53. Succession of the Juniper (*Juniperus sibirica*)
54. Grasing impact

7. Matrixes for ecological monitoring of the objects in the National Parks

In each of the parks depending on the specific conditions the monitoring objects were selected. Most of the objects are common for the three National Parks and the main difference is in the selected animal and plant species, some of which are only met in one particular park. The monitoring objects matrixes also provide information if there is or there is not an available methodology for monitoring, periodicality of observation, major indicators etc.

Principles Developed by the Parks for Developing and Implementing the Eco-Monitoring System in the National Parks

1. **Practical orientation:** the monitoring effort should contribute towards the direct, adaptive management of the Park and the making of concrete management decisions.

2. **The Management Plan as the framework of the monitoring system:** the results of the implementation of the Management Plan should also be monitored in order to assess its effectiveness.

3. **Complex yet differentiated approach:** monitoring a number of indicators (species, communities, infrastructure components, etc.) throughout the Park territory, while using a differential approach in monitoring separate populations of the species as characterizing individual Park sections. For example, while it is important to develop a monitoring system that is representative of the whole Park, we also need to monitor the viability and status of individual populations, e.g. the souslik (*Spermophilus citellus*) population in the Belmeken area (Belovo Park Section, Rila NP); the only population of Balkan silene (*Silene balcanica*) in Central Balkan NP, etc.

4. **Cost efficiency:** the indicators, locations, objects and sites, and the monitoring methods should be informative, effective and should fit into the Park employees' routine in such a way as to require minimum additional funding of the monitoring activities.

Criteria for the Selection of Monitoring Objects and Sites

The main tool guiding the selection of monitoring objects and sites are the Management Plans of Rila and Central Balkan National Parks. The following criteria were used in selecting specific sites and in developing the monitoring matrix for each Park:

1. Species/habitats at risk;

2. Species/habitats of high conservation significance;

3. Control areas – areas free of anthropogenic impact;

4. Tourist sites in the pilot areas: rest sites, observation points, camp sites;

5. Areas of high tourist pressure (e.g., the Seven Lakes in Rila NP);

6. Species/habitats constituting sufficiently representative indicators of changes in several monitored environmental components;

7. Sites for which there is available information as a result of systematic studies in the past;

8. Sites that are subject to monitoring at present;

9. Representative monitoring sites and areas: where possible comprehensive monitoring areas should be selected in such a way as to be representative of the entire Park territory.

7.1. Matrix for Rila NP

MINISTERY OF ENVIRONMENT AND WATERS
D I R E C T O R A T E
RILA NATIONAL PARK

Matrix
Ecological Monitoring Matrix for Rila National Park

The following areas within Rila NP are proposed for complex monitoring:

1. **The Seven Lakes**: from Vada roadman's lodge – the Seven Lakes up to Damga Peak (the seventh lake); the territory belongs to Dupnitza and Govedartzi Park Sections (PS);
2. **Mussala Peak**:
    2.1 From Mussala Peak to Mussala Chalet, Borovets PS
    2.2 From Mussala Peak to Third Window, Beli Iskar PS;
3. **Parangalitza**: Parangalitza Nature Reserve – on both sides along the Bistritza river valley up to Makedonia Chalet, Blagoevgrad PS;
4. **Malyovitza**: from Yavorova Polyana – Malyovitza complex – Malyovitza Chalet – Malyovitza Peak, Govedartzi PS;
5. *Granchar Chalet: Djanka – Granchar Chalet – Nechtenitza – Ropalitza river – Djanka, Yakoruda PS;*
6. *Belmeken: The area around Belmeken Reservoir – the road from the dam to Pomochena Polyana – the road from the counter-dam to Kaldaritza river, Belovo PS;*
7. *Semkovo: from Semkovo – Vapski Lakes – Vapski Cirque and up to the mountain ridge, Belitza PS.*

Areas ## 1 through 4 are given priority in launching the monitoring system development and implementation. The scheme presented – regions and objects is open and represents the base for launching of the monitoring system on the territory of the Park. Its future development and supplement is forthcoming. The view of the NPD for objects and sites of priority monitoring need are presented here.

LIST OF THE OBJECTS WITH DEVELOPED MONITORING METHODOLOGY

Object	Indexes	Observation point	Prodigality	Methodology	NPD	External executor	Justification	Information flow
ABIOTIC OBJECTS								
1. Soils	pH (H$_2$O), C organic., N total, P - analysis exchange cations - K, Ca, Mg, H, Na, Al, Fe, Mn, CaCO$_3$ (pH<6); Na, Zn, Cu, Pb, As, Cd	In forests and pastures in the regions selected for complex monitoring.	Once in 5 years 1 sample from dead forest ground layer and 1 sample from surface layer 0-10 cm is taken from each sample plot.	According to approved methodologies of EEA RIEW – ISO, BDS	Park staff conducts the sample collection.	RIEW/EEA – sample analysis and information summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for assessment and prognoses of vegetation status and in particular forest status. Warns when the natural soil parameters/functions are disrupted.	RIEW to NPD RIEW to EEA Protocol forms from soil sample analysis results, approved from EEA and used by RIEW Once a year after analyses have been conducted
2. Precipitation	Quantity, pH Consultation with RIEW/EEA experts is necessary – including weather to use all indexes for forest monitoring from the 16 km grid.	Existing stations (IF, BAS, INRNE, etc.) and in forests were monitoring transects are set up. Consultation with BAS/EEA is necessary	Currently. Consultation with RIEW/EEA experts is necessary	According approved methodologies of EEA/ RIEW	Assistance, Park guides	RIEW/EEA, IF, BAS etc. Analysis, Summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for assessment and prognoses of vegetation status and in particular forest status.	RIEW/ IF, BAS, etc. to EEA and NPD Data Forms and electronic format

3. Water Quality-Rivers	Physicochemical indexes: Water temperature, pH, solute oxygen, oxygen saturation, electric conductivity, turbidity, permanganate oxidizability, biological utilization of oxygen, chemical utilization of oxygen, nitric forms, phosphate, solute substances, not solute substances, manganese and iron	Rivers – before and after tourist objects (huts)	4 times a year – once in three months.	According approved methodologies applied by EEA RIEW – ISO, BDS	Sample collecting assistance Park guides,	RIEW/EEA – sample analysis and information summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for water status assessment, tourist infrastructure impact, human health guarantee and habitat and biodiversity conservation.	RIEW to NPD RIEW to EEA Data forms from water sample analysis results approved from EEA and used by RIEW Once in three months after analysis's have been conducted
4. Water Quality-Lakes	Physicochemical indexes: pH, solute oxygen, oxygen saturation, electric conductivity, turbidity, permanganate oxidizability, biological utilization of oxygen, chemical utilization of oxygen, nitric forms, phosphate, solute substances, not solute substances, chlorophyll "a", transparency by Seki, macrophytes quantity, phytoplankton, alluvium	Lakes	Once a year	According approved methodologies Applied by EEA RIEW – ISO, BDS	Sample collecting assistance Park guides,	RIEW/EEA – sample analysis and information summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for water status assessment, tourist infrastructure impact, human health guarantee and habitat and biodiversity conservation.	RIEW to NPD RIEW to EEA Data forms from water sample analysis results approved from EEA and used by RIEW. Once a year after analyses have been conducted.

BIOTIC OBJECTS

5. *Forests*	Forests inventory description, defoliation decoloration regeneration	Transect in: 1)Parangalitsa, 2)Sofan, 3)Burzanska polyana, 4)Ovnarsko, 5) Semkovo	Annually one transparent (In 5 years each)	According specialized for NP methodology	Field work Data processing and analyses	External experts as necessary	For management needs, the indexes are consistent with the national system for forests monitoring and can be used	For NPD, NPD to EEA Forms and electronic format data
ANIMALS	**Necessity:** A key species are selected - conservationally significant, vulnerable, indicators and/or characteristic for particular habitats. Also key species having essential significance for the ecosystems balance. Species with high potential for conflict with different users are included as well. The information is necessary to the Park Directorate for management purposes and to answer the questions: What is the populations' status in the NP? What are the trends? Is the species population in the park stable? Are the implemented management measures enough and efficient? Are the Management goals achieved? The conservation status of the species selected for monitoring is given in Appendix 4. Note: The national statistics collects data annually for all hoofed species, the wolf, the bear, the wild cat, capercaillie, partridge; nocturnal birds of prey. Species chosen with priority for more extensive monitoring are presented here.							
BIG MAMMALS								
8. *Bear*	Number, population characteristics, damages on wild and domestic animals	In the entire park	Annually, constantly	According specialized for NP methodology	Field work Data processing and analyses	Experts, consultants if necessary	For management needs. See above **Necessity**	For NPD, NNPS, EEA Forms and electronic format data

SMALL MAMMALS

				According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
10. European souslik	Number, population characteristics, periodicity of the annual life cycle	Belmeken	Annually, Seasonal	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
DIURNAL BIRDS OF PREY[1]	Number, nesting areas, population characteristics	In the entire park were they nest	Annually, constantly Monitoring through the nesting season	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants, volunteers, BSPB if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
11. Short-toed Eagle	Determine weather it nests in the park							
12. Long-legged buzzard	Determine weather it nests in the park							
13. Golden eagle	Monitoring of the known nests							
14. Saker falcon	Mainly Belmeken							
15. Peregrine Falcon	The two known nests							
16. Imperial eagle	*It is not an object for monitoring in Rila NP*							

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[1] For group of objects the columns are fulfilled in one general row. The parameters species specific are pointed on the row for the relevant specie.

NOCTURNAL BIRDS OF PREY	Number, nesting areas, population characteristics	In the entire park were they nest	Annually, constantly Monitoring through the nesting season,	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants, volunteers, BSPB if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
17. Tengmalm's owl	In the known single formation – in Semkovo region							
18. Eagle owl	*It is not an object for monitoring in Rila NP*							
19. Pygmy owl	*It is not an object for monitoring in Rila NP*							
20. Ural owl	*It is not an object for monitoring in Rila NP*							
FOREST BIRDS	Number	In the entire park were they nest	Annually, constantly Monitoring through the nesting season,	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants, volunteers, BSPB if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
21. Hazel hen	6 Localities: Plaso, Stankova laka, Belata prast, Titevitsa, Kurtev chuchur, Bukata							
22. Capercaillie	The known localities							
23. Rock Partridge	*It is not an object for monitoring in Rila NP*							
24. White-back woodpecker	*It is not an object for monitoring in Rila NP*							

BIRDS of ROCKY HABITATS

25. Wall creeper	It is not an object for monitoring in Rila NP

26. Yellow billed chough	It is not an object for monitoring in Rila NP

VEGETATION

MEDICINAL PLANTS – INDUSTRIAL USE OBJECTS	Population and phenological monitoring, Coloration, damages	In the entire park. In the regions for collection of resources and the ones without use as control sites	Annually, Seasonally	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants if necessary	For monitoring of the status of the used species and localities. For comparative analyzes with territories with restricted use. For management decisions: - Unified collection starting date - Period for resources assessment - Quantities and regions permitted for collection or restriction for collection. The methodology is unified, only the specific biology and ecology of the different species has to be considered.	For NPD, NNPS Forms and electronic format data
50. Bilberry	For Belitza, Yakoruda and Belovo PS – total of 6 observation sites.							

VEGETATION COMMUNITIES , SUCCESSION PROCESS ES

53. Succession of the Juniper	It is not an object for monitoring in Rila NP

LIST OF OBJECTS WITHOUT MONITORING METHODOLOGY DEVELOPED

Object	Indexes	Monitoring area	Periodicity	Methodology	NPD	External implementer	Necessity	Information flow

Biotic objects

Object	Indexes	Monitoring area	Periodicity	Methodology	NPD	External implementer	Necessity	Information flow
ANIMALS	**Necessity:** A key species are selected - conservationally significant, vulnerable, indicators and/or characteristic for particular habitats. Also key species having essential significance for the ecosystems balance. Species with high potential for conflict with different users are included as well. The information is necessary to the Park Directorate for management purposes and to answer the questions: What is the populations' status in the NP? What are the trends? Is the species population in the park stable? Are the implemented management measures enough and efficient? Are the Management goals achieved? The conservation status of the species selected for monitoring is given in Appendix 4. Note: The national statistics collects data annually for all hoofed species, the wolf, the bear, the wild cat, capercaillie, partridge; nocturnal birds of prey. Species chosen with priority for more extensive monitoring are presented here.							
BIG MAMMELS								
6. Chamois	Number, population characteristics	In the entire park	Annually, constantly	NP methodology is under development	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
7. Red deer	Number, population characteristics	In the entire park	Annually, constantly	There is no methodology developed	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data

9. Wolf	Number, population characteristics, damages caused to domestic animals	In the entire park	Annually, constantly	NP methodology is under development	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
FISHES								
27. Balkan trout	Number	The methodology will defined, with priority in the regions 1-4	Annually, constantly	There is no methodology developed	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. Species status information; effect of the applied measures, norms and regimes for fishing.	For NPD, NNPS Forms and electronic format data
AMPHIBIANS AND REPTILES	Consultation with experts is necessary for selection of indicator species. According to NPD assessment 3 species are proposed here.	The methodology will define, with priority in the regions 1-4	The methodology will define	There is no methodology developed	The methodology will define	The methodology will define	For management needs. See above - **Necessity.** They give quick information for changes, successions and trends. React quickly on habitats changes.	For NPD, NNPS Forms and electronic format data
28. Alpine newt	Number	In the known formations	Annually	There is no methodology developed	Field monitoring The methodology will defined	Experts, consultants if necessary	For management needs. See above - **Necessity** Conservation significant specie	For NPD, NNPS Forms and electronic format data

29. Viviparous lizard	The methodology will define	The methodology will define, with priority in the regions 1-4	The methodology will define	There is no methodology developed	The methodology will define и	The methodolog y will define	For management needs. See above - **Necessity** Conservation significant specie	For NPD, NNPS Forms and electronic format data
30. European tree-frog	The methodology will define	The methodology will define, with priority in the regions 1-4	The methodology will define	There is no methodology developed	The methodology will define	The methodolog y will define	For management needs. See above - **Necessity** Conservation significant specie	For NPD, NNPS Forms and electronic format data
IINVERTABRATES	For selecting invertebrate indicator species consultation with experts is necessary. No approved unified methodology exists. There is a methodology used in CBNP during 1999 and 2000.	The methodology will define the areas, with priority in the regions 1-4	The methodology will define	There is no methodology developed	Sample collection assistance	The methodology will defined BAS	For management needs. See above **Necessity.** They give quick information for changes, successions and trends. React quickly on habitats changes.	BAS to NPD, NNPS Forms and electronic format data

PLANTS

CONSERVATION SIGNIFICANT SPECIES	Number, cover, locality size, development stage, status	Localities with priority in the regions 1-4; the single localities of the rarest species	Annually, Seasonally for most of the species	There is no methodology developed	Field monitoring Primary data processing and analyses	Experts, consultants if necessary	The following species groups are under monitoring– unique, rare, endangered, vulnerable species, species object of interest for collection from tourists or local population (attractive plants, medicinal plants) The requirements will be specific conserning species biology and ecology. As a whole the monitoring methods are equal.	For NPD, NNPS Forms and electronic format data
31.Rose root								
32. Yellow Gentian								
33. Dotted-flowered Gentian								
34. Rila Rhubarb								
35. Iris								
36. Edelweiss	*It is not an object for monitoring in Rila NP*							
37. Balkan campion	*It is not an object for monitoring in Rila NP*							
38. Yellow Lily	*It is not an object for monitoring in Rila NP*							
39. Rhododendron	*It is not an object for monitoring in Rila NP*							
40. Blagaev`s spurge	*It is not an object for monitoring in Rila NP*							
41. Sundew	*It is not an object for monitoring in Rila NP*							
42. Balkan primrose	*It is not an object for monitoring in Rila NP*							
43. Vihren`s erigeron	*It is not an object for monitoring in Rila NP*							
44. Banderica Lady`s mantle	*It is not an object for monitoring in Rila NP*							
45. Pirin Poppy	*It is not an object for monitoring in Rila NP*							
46. Pirin hogweed	*It is not an object for monitoring in Rila NP*							

47. Stefan`s Hawkweed	It is not an object for monitoring in Rila NP							
48. Pirin`s Thyme	It is not an object for monitoring in Rila NP							
49. Urumov`s Oxytropis	It is not an object for monitoring in Rila NP							

TOURISM

| 51.Tourism flow | Number, tourists distribution | The methodology will define the areas, with priority in the regions 1-4 | Annually | There is no methodology developed | Field monitoring Primary data processing and analyses | Experts, consultants if necessary, volunteers, students | Aims to define the carrying capacity of the territory (limits of acceptable use) and limits of acceptable change in the intensive tourism regions. Should answer the questions _In what limits tourism and NP biodiversity conservation are compatible_ | For NPD, NNPS Forms and electronic format data |
| 52. Tourism impact Trails, Resting sites/View points Bivouacs, chalets, Lake and along lake habitats, rock habitats | The methodology is under development | The proposed areas should be defined. Covers the entire park, with priority in regions 1-4. | Annually, constantly | The methodology is under development | Field monitoring Primary data processing and analyses | Experts, consultants if necessary, volunteers, students | See above | For NPD, NNPS Forms and electronic format data |

VEGETATION COMMUNITIES, SUCCESIONS PROCESSES

53. Grazing impact	There is no methodology developed	The methodology will defined the areas, with priority in the regions 1-4	Annually	No methodology is approved	Field monitoring Primary data processing and analyses	Experts, consultants if necessary,	The information is necessary for defining the high mountain livestock husbandry significance for maintaining the biodiversity in grass and bush habitats. Should answer the question: *What do we do*? if the tendency of decreasing in the number of pasturing animals continues. For management needs.	For NPD, NNPS Forms and electronic format data

7.2.   Matrix for Central Balkan NP

MINISTERY OF ENVIRONMENT AND WATERS
CENTRAL BALKAN NATIONAL PARK DIRECTORATE

Matrix
Ecological Monitoring Matrix for Central Balkan National Park

For the territory of Central Balkan National Park, the following areas are proposed for comprehensive monitoring:

1. The Vezhen Chalet – Benkovski Chalet area
2. The Beklemeto area
3. The area around Botev Peak
4. The area around Taja Chalet

Areas ## 1 through 4 are given priority in launching the monitoring system development and implementation. The scheme presented – regions and objects is open and represents the base for launching of the monitoring system on the territory of the Park. Its future development and supplement is forthcoming. The view of the NPD for objects and sites of priority monitoring need are presented here.

LIST OF THE OBJECTS WITH DEVELOPED MONITORING METHODOLOGY

Object	Indexes	Observation point	Prodigality	Methodology	NPD	External executor	Justification	Information flow
ABIOTIC OBJECTS								
1. Soils	pH (H$_2$O), C organic., N total, P - analysis exchange cations - K, Ca, Mg, H, Na, Al, Fe, Mn, CaCO$_3$ (pH<6); Na, Zn, Cu, Pb, As, Cd	In forests and pastures in the regions selected for complex monitoring.	Once in 5 years 1 sample from dead forest ground layer and 1 sample from surface layer 0-10 cm is taken from each sample plot.	According to approved methodologies of EEA RIEW – ISO, BDS	Park staff conducts the sample collection.	RIEW/EEA – sample analysis and information summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for assessment and prognoses of vegetation status and in particular forest status. Warns when the natural soil parameters/functions are disrupted.	RIEW to NPD RIEW to EEA Protocol forms from soil sample analysis results, approved from EEA and used by RIEW Once a year after analyses have been conducted
2. Precipitation	Quantity, pH Consultation with RIEW/EEA experts is necessary – including weather to use all indexes for forest monitoring from the 16 km grid.	Existing stations (IF, BAS, INRNE, etc.) and in forests were monitoring transects are set up. Consultation with BAS/EEA is necessary	Currently. Consultation with RIEW/EEA experts is necessary	According approved methodologies of EEA/ RIEW	Assistance, Park guides	RIEW/EEA, IF, BAS etc. Analysis, Summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for assessment and prognoses of vegetation status and in particular forest status.	RIEW/ IF, BAS, etc. to EEA and NPD Data Forms and electronic format

3. Water Quality-Rivers	**Physicochemical indexes:** Water temperature, pH, solute oxygen, oxygen saturation, electric conductivity, turbidity, permanganate oxidizability, biological utilization of oxygen, chemical utilization of oxygen, nitric forms, phosphate, solute substances, not solute substances, manganese and iron	Rivers – before and after tourist objects (huts)	4 times a year – once in three months.	According approved methodologies applied by EEA RIEW – ISO, BDS	Sample collecting assistance Park guides,	RIEW/EEA – sample analysis and information summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for water status assessment, tourist infrastructure impact, human health guarantee and habitat and biodiversity conservation.	RIEW to NPD RIEW to EEA Data forms from water sample analysis results approved from EEA and used by RIEW Once in three months after analysis's have been conducted
4. Water Quality-Lakes	**Physicochemical indexes:** pH, solute oxygen, oxygen saturation, electric conductivity, turbidity, permanganate oxidizability, biological utilization of oxygen, chemical utilization of oxygen, nitric forms, phosphate, solute substances, not solute substances, chlorophyll "a", transparency by Seki, macrophytes quantity, phytoplankton, alluvium	Lakes	Once a year	According approved methodologies Applied by EEA RIEW – ISO, BDS	Sample collecting assistance Park guides,	RIEW/EEA – sample analysis and information summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for water status assessment, tourist infrastructure impact, human health guarantee and habitat and biodiversity conservation.	RIEW to NPD RIEW to EEA Data forms from water sample analysis results approved from EEA and used by RIEW. Once a year after analyses have been conducted.

BIOTIC OBJECTS

5. Forests	Forests inventory description, defoliation decoloration regeneration	Transect in: 1)Parangalitsa, 2)Sofan, 3)Burzanska polyana, 4)Ovnarsko, 5) Semkovo	Annually one transparent (In 5 years each)	According specialized for NP methodology	Field work Data processing and analyses	External experts as necessary	For management needs, the indexes are consistent with the national system for forests monitoring and can be used	For NPD, NPD to EEA Forms and electronic format data

<u>ANIMALS</u>	**Necessity:** A key species are selected - conservationally significant, vulnerable, indicators and/or characteristic for particular habitats. Also key species having essential significance for the ecosystems balance. Species with high potential for conflict with different users are included as well. The information is necessary to the Park Directorate for management purposes and to answer the questions: What is the populations' status in the NP? What are the trends? Is the species population in the park stable? Are the implemented management measures enough and efficient? Are the Management goals achieved? The conservation status of the species selected for monitoring is given in Appendix 4. Note: The national statistics collects data annually for all hoofed species, the wolf, the bear, the wild cat, capercaillie, partridge; nocturnal birds of prey. Species chosen with priority for more extensive monitoring are presented here.

BIG MAMMALS

8. Bear	Number, population characteristics, damages on wild and domestic animals	In the entire park	Annually, constantly	According specialized for NP methodology	Field work Data processing and analyses	Experts, consultants if necessary	For management needs. See above **Necessity**	For NPD, NNPS, EEA Forms and electronic format data

SMALL MAMMALS

10. European souslik	Number, population characteristics, periodicity of the annual life cycle	Belmeken	Annually, Seasonal	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
DIURNAL BIRDS OF PREY[2]	Number, nesting areas, population characteristics	In the entire park were they nest	Annually, constantly Monitoring through the nesting season	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants, volunteers, BSPB if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
11. Short-toed Eagle	Determine weather it nests in the park							
12. Long-legged buzzard	In the emtire park The known nests							
13. Golden eagle	In the emtire park The known nests							
14. Saker falcon	In the emtire park Mainly in Taza PS, Kalofer PS							
15. Peregrine Falcon	In the emtire park The known nests							
16. Imperial eagle	In the emtire park Mainly in Klissura PS, Kalofer PS							

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[2] For group of objects the columns are fulfilled in one general row. The parameters species specific are pointed on the row for the relevant specie.

NOCTURNAL BIRDS OF PREY	Number, nesting areas, population characteristics	In the entire park were they nest	Annually, constantly Monitoring through the nesting season,	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants, volunteers, BSPB if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
17. Tengmalm's owl	*It is not an object for monitoring in Central Balkan NP*							
18. Eagle owl								
19. Pygmy owl	Known nest							
20. Ural owl								
FOREST BIRDS	Number	In the entire park were they nest	Annually, constantly Monitoring through the nesting season,	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants, volunteers, BSPB if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
21. Hazel hen	3 Localities: Damla dere, Chernata reka, Gabrovnitsa							
22. Capercaillie	*It is not an object for monitoring in Central Balkan NP*							
23. Rock Partridge	In the region of: Peeshti skali, Gerdek Tepe, Kurt Hisar, Litf							
24. White-back woodpecker	Gerdek Tepe, Kozi brod, Pleven chalet							

BIRDS of ROCKY HABITATS

25. Wall creeper	Determining the nest colonies in the Park
26. Yellow billed chough	Determining the nest colonies in the Park

VEGETATION

MEDICINAL PLANTS – INDUSTRIAL USE OBJECTS	Population and phenological monitoring, Coloration, damages	In the entire park. In the regions for collection of resources and the ones without use as control sites	Annually, Seasonally	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants if necessary	For monitoring of the status of the used species and localities. For comparative analyzes with territories with restricted use. For management decisions: - Unified collection starting date - Period for resources assessment - Quantities and regions permitted for collection or restriction for collection. The methodology is unified, only the specific biology and ecology of the different species has to be considered.	For NPD, NNPS Forms and electronic format data
50. Bilberry	For Klissura PS 4 points.							

VEGETATION COMMUNITIES, SUCCESSION PROCESS ES

53. Succession of the Juniper	Size of the bush spot	The set ones in 1999/2000	Each 3 years	Methodology for CBNP	*Field monitoring* Preliminary data processing and analysis	*If necessary* Experts consultants	Gives information for the change speed of the habitats in the treeless zone. Has to answer the questions: Is interferance needed? Where? What kind?	For NPD, NNPS

LIST OF OBJECTS WITHOUT MONITORING METHODOLOGY DEVELOPED

Object	Indexes	Monitoring area	Periodicity	Methodology	NPD	External implementer	Necessity	Information flow

Biotic objects	
<u>**ANIMALS**</u>	**Necessity:** A key species are selected - conservationally significant, vulnerable, indicators and/or characteristic for particular habitats. Also key species having essential significance for the ecosystems balance. Species with high potential for conflict with different users are included as well. The information is necessary to the Park Directorate for management purposes and to answer the questions: What is the populations' status in the NP? What are the trends? Is the species population in the park stable? Are the implemented management measures enough and efficient? Are the Management goals achieved? The conservation status of the species selected for monitoring is given in Appendix 4. Note: The national statistics collects data annually for all hoofed species, the wolf, the bear, the wild cat, capercaillie, partridge; nocturnal birds of prey. Species chosen with priority for more extensive monitoring are presented here.

BIG MAMMELS

6. Chamois	Number, population characteristics	In the entire park	Annually, constantly	NP methodology is under development	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
7. Red deer	Number, population characteristics	In the entire park	Annually, constantly	There is no methodology developed	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
9. Wolf	Number, population characteristics, damages caused to domestic animals	In the entire park	Annually, constantly	NP methodology is under development	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data

FISHES

				There is no methodology developed	Field monitoring Data processing and analyses	Experts, consultants if necessary		
27. Balkan trout	Number	The methodology will defined, with priority in the regions 1-4	Annually				For management needs. Species status information; effect of the applied measures, norms and regimes for fishing.	For NPD, NNPS Forms and electronic format data
AMPHIBIANS AND REPTILES	Consultation with experts is necessary for selection of indicator species. According to NPD assessment 3 species are proposed here.	The methodology will define, with priority in the regions 1-4	The methodology will define	There is no methodology developed	The methodology will define	The methodology will define	For management needs. See above - **Necessity.** They give quick information for changes, successions and trends. React quickly on habitats changes.	For NPD, NNPS Forms and electronic format data
28. Alpine newt	*It is not an object for monitoring in Central Balkan NP*							
29. Viviparous lizard	*It is not an object for monitoring in Central Balkan NP*							
30. European tree-frog	The methodology will define	The methodology will define, with priority in the regions 1-4	The methodology will define	There is no methodology developed	The methodology will define	The methodology y will define	For management needs. See above - **Necessity** Conservation significant specie	For NPD, NNPS Forms and electronic format data

IINVERTABRATES	For selecting invertebrate indicator species consultation with experts is necessary. No approved unified methodology exists. There is a methodology used in CBNP during 1999 and 2000.	The methodology will define the areas, with priority in the regions 1-4	The methodology will define	There is no methodology developed	Sample collection assistance	The methodology will defined BAS	For management needs. See above **Necessity.** They give quick information for changes, successions and trends. React quickly on habitats changes.	BAS to NPD, NNPS Forms and electronic format data

PLANTS

CONSERVATION SIGNIFICANT SPECIES	Number, cover, locality size, development stage, status	Localities with priority in the regions 1-4; the single localities of the rarest species	Annually, Seasonally for most of the species	There is no methodology developed	Field monitoring Primary data processing and analyses	Experts, consultants if necessary	The following species groups are under monitoring– unique, rare, endangered, vulnerable species, species object of interest for collection from tourists or local population (attractive plants, medicinal plants) The requirements will be specific concerning species biology and ecology. As a whole the monitoring methods are equal.	For NPD, NNPS Forms and electronic format data
31.Rose root								
32. Yellow Gentian								
33. Dotted-flowered Gentian								
34. Rila Rhubarb	*It is not an object for monitoring in Central Balkan NP*							
35. Iris								
36. Edelweiss								
37. Balkan campion								

38. Yellow Lily	
39. Rhododendron	
40. Blagaev`s spurge	
41. Sundew	
42. Balkan primrose	
43. Vihren`s erigeron	*It is not an object for monitoring in Central Balkan NP*
44. Banderica Lady`s mantle	*It is not an object for monitoring in Central Balkan NP*
45. Pirin Poppy	*It is not an object for monitoring in Central Balkan NP*
46. Pirin hogweed	*It is not an object for monitoring in Central Balkan NP*
47. Stefan`s Hawkweed	*It is not an object for monitoring in Central Balkan NP*
48. Pirin`s Thyme	*It is not an object for monitoring in Central Balkan NP*
49. Urumov`s Oxytropis	*It is not an object for monitoring in Central Balkan NP*

TOURISM

51.Tourism flow	Number, tourists distribution	The methodology will define the areas, with priority in the regions 1-4	Annually	There is no methodology developed	Field monitoring Primary data processing and analyses	Experts, consultants if necessary, volunteers, students	Aims to define the carrying capacity of the territory (limits of acceptable use) and limits of acceptable change in the intensive tourism regions. Should answer the questions *In what limits tourism and NP biodiversity conservation are compatible*	For NPD, NNPS Forms and electronic format data

52. Tourism impact Trails, Resting sites/View points Bivouacs, chalets, Lake and along lake habitats, rock habitats	The methodology is under development	The proposed areas should be defined. Covers the entire park, with priority in regions 1-4.	Annually, constantly	The methodology is under development	Field monitoring Primary data processing and analyses	Experts, consultants if necessary, volunteers, students	See above	For NPD, NNPS Forms and electronic format data

VEGETATION COMMUNITIES, SUCCESIONS PROCESSES

54. Grazing impact	There is no methodology developed	The methodology will defined the areas, with priority in the regions 1-4	Annually	No methodology is approved	Field monitoring Primary data processing and analyses	Experts, consultants if necessary,	The information is necessary for defining the high mountain livestock husbandry significance for maintaining the biodiversity in grass and bush habitats. Should answer the question: *What do we do*? if the tendency of decreasing in the number of pasturing animals continues. For management needs.	For NPD, NNPS Forms and electronic format data

7.3.   Matrix for Pirin NP

MINISTRY OF ENVIRONMENT AND WATER
PIRIN NATIONAL PARK

Matrix

Ecological Monitoring Matrix for Pirin National Park

For the territory of Pirin National Park, the following areas are selected for complex monitoring:
1.   Banderishki circus
2.   Ski zone: Todorka peak – Shiligarnika – Banderishka medow – the Echimene site
3.   Spanopolski and Bashliiski circuses
4.   Baiuvi dupki circus and Julen reserve
5.   Vlahinski and Georgiiski circus

Areas ## 1 through 4 are given priority in launching the monitoring system development and implementation. The scheme presented – regions and objects is open and represents the base for launching of the monitoring system on the territory of the Park. Its future development and supplement is forthcoming. The view of the NPD for objects and sites of priority monitoring need are presented here.

LIST OF THE OBJECTS WITH DEVELOPED MONITORING METHODOLOGY

Object	Indexes	Observation point	Prodigality	Methodology	NPD	External executor	Justification	Information flow
			ABIOTIC OBJECTS					
1. Soils	pH (H$_2$O), C organic., N total, P - analysis exchange cations - K, Ca, Mg, H, Na, Al, Fe, Mn, CaCO$_3$ (pH<6); Na, Zn, Cu, Pb, As, Cd	In forests and pastures in the regions selected for complex monitoring.	Once in 5 years 1 sample from dead forest ground layer and 1 sample from surface layer 0-10 cm is taken from each sample plot.	According to approved methodologies of EEA RIEW – ISO, BDS	Park staff conducts the sample collection.	RIEW/EEA – sample analysis and information summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for assessment and prognoses of vegetation status and in particular forest status. Warns when the natural soil parameters/functions are disrupted.	RIEW to NPD RIEW to EEA Protocol forms from soil sample analysis results, approved from EEA and used by RIEW Once a year after analyses have been conducted
2. Precipitation	Quantity, pH Consultation with RIEW/EEA experts is necessary – including weather to use all indexes for forest monitoring from the 16 km grid.	Existing stations (IF, BAS, INRNE, etc.) and in forests were monitoring transects are set up. Consultation with BAS/EEA is necessary	Currently. Consultation with RIEW/EEA experts is necessary	According approved methodologies of EEA/ RIEW	Assistance, Park guides	RIEW/EEA, IF, BAS etc. Analysis, Summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for assessment and prognoses of vegetation status and in particular forest status.	RIEW/ IF, BAS, etc. to EEA and NPD Data Forms and electronic format

3. Water Quality-Rivers	Physicochemical indexes: Water temperature, pH, solute oxygen, oxygen saturation, electric conductivity, turbidity, permanganate oxidizability, biological utilization of oxygen, chemical utilization of oxygen, nitric forms, phosphate, solute substances, not solute substances, manganese and iron	Rivers – before and after tourist objects (huts)	4 times a year – once in three months.	According approved methodologies applied by EEA RIEW – ISO, BDS	Sample collecting assistance Park guides,	RIEW/EEA – sample analysis and information summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for water status assessment, tourist infrastructure impact, human health guarantee and habitat and biodiversity conservation.	RIEW to NPD RIEW to EEA Data forms from water sample analysis results approved from EEA and used by RIEW Once in three months after analysis's have been conducted
4. Water Quality-Lakes	Physicochemical indexes: pH, solute oxygen, oxygen saturation, electric conductivity, turbidity, permanganate oxidizability, biological utilization of oxygen, chemical utilization of oxygen, nitric forms, phosphate, solute substances, not solute substances, chlorophyll "a", transparency by Seki, macrophytes quantity, phytoplankton, alluvium	Lakes	Once a year	According approved methodologies Applied by EEA RIEW – ISO, BDS	Sample collecting assistance Park guides,	RIEW/EEA – sample analysis and information summary	The information collected in the parks complements the National monitoring system network. On park level it is necessary for water status assessment, tourist infrastructure impact, human health guarantee and habitat and biodiversity conservation.	RIEW to NPD RIEW to EEA Data forms from water sample analysis results approved from EEA and used by RIEW. Once a year after analyses have been conducted.

BIOTIC OBJECTS

5. Forests	Forests inventory description, defoliation decoloration regeneration	Transect in: 1)Parangalitsa, 2)Sofan, 3)Burzanska polyana, 4)Ovnarsko, 5) Semkovo	Annually one transparent (In 5 years each)	According specialized for NP methodology	Field work Data processing and analyses	External experts as necessary	For management needs, the indexes are consistent with the national system for forests monitoring and can be used	For NPD, NPD to EEA Forms and electronic format data
ANIMALS	**Necessity:** A key species are selected - conservationally significant, vulnerable, indicators and/or characteristic for particular habitats. Also key species having essential significance for the ecosystems balance. Species with high potential for conflict with different users are included as well. The information is necessary to the Park Directorate for management purposes and to answer the questions: What is the populations' status in the NP? What are the trends? Is the species population in the park stable? Are the implemented management measures enough and efficient? Are the Management goals achieved? The conservation status of the species selected for monitoring is given in Appendix 4.

Note: The national statistics collects data annually for all hoofed species, the wolf, the bear, the wild cat, capercaillie, partridge; nocturnal birds of prey. Species chosen with priority for more extensive monitoring are presented here. | | | | | | | |

BIG MAMMALS

8. Bear	Number, population characteristics, damages on wild and domestic animals	In the entire park	Annually, constantly	According specialized for NP methodology	Field work Data processing and analyses	Experts, consultants if necessary	For management needs. See above **Necessity**	For NPD, NNPS, EEA Forms and electronic format data

SMALL MAMMALS

10. European souslik	*It is not an object for monitoring in Pirin NP*							

DIURNAL BIRDS OF PREY[3]	Number, nesting areas, population characteristics	In the entire park were they nest	Annually, constantly Monitoring through the nesting season	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants, volunteers, BSPB if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
11. Short-toed Eagle								
12. Long-legged buzzard								
13. Golden eagle								
14. Saker falcon								
15. Peregrine Falcon								
16. Imperial eagle								
NOCTURNAL BIRDS OF PREY	Number, nesting areas, population characteristics	In the entire park were they nest	Annually, constantly Monitoring through the nesting season,	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants, volunteers, BSPB if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
17. Tengmalm's owl								

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[3] For group of objects the columns are fulfilled in one general row. The parameters species specific are pointed on the row for the relevant specie.

18. Eagle owl								
19. Pygmy owl								
20. Ural owl								
FOREST BIRDS	Number	In the entire park were they nest	Annually, constantly Monitoring through the nesting season,	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants, volunteers, BSPB if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data
21. Hazel hen								
22. Capercaillie								
23. Rock Partridge								
24. White-back woodpecker								
BIRDS of ROCKY HABITATS								
25. Wall creeper								
26. Yellow billed chough								
VEGETATION								

MEDICINAL PLANTS – INDUSTRIAL USE OBJECTS	Population and phenological monitoring, Coloration, damages	In the entire park. In the regions for collection of resources and the ones without use as control sites	Annually, Seasonally	According specialized for NP methodology	Field monitoring Data processing and analyses	Experts, consultants if necessary	For monitoring of the status of the used species and localities. For comparative analyzes with territories with restricted use. For management decisions: • Unified collection starting date • Period for resources assessment • Quantities and regions permitted for collection or restriction for collection. The methodology is unified, only the specific biology and ecology of the different species has to be considered.	For NPD, NNPS Forms and electronic format data

50. Bilberry

VEGETATION COMMUNITIES , SUCCESSION PROCESS ES

53. Succession of the Juniper	Size of the bush spot	In the selected for monitoring regions	Each 3 years	Methodology for CBNP	**Field monitoring** Preliminary data processing and analysis	**If necessary** Experts consultants	Gives information for the change speed of the habitats in the treeless zone. Has to answer the questions: Is interferance needed? Where? What kind?	For NPD, NNPS

LIST OF OBJECTS WITHOUT MONITORING METHODOLOGY DEVELOPED

Object	Indexes	Monitoring area	Periodicity	Methodology	NPD	External implementer	Necessity	Information flow

<table>
<tr><td colspan="9" align="center">*Biotic objects*</td></tr>
<tr>
<td><u>ANIMALS</u></td>
<td colspan="8">Necessity: A key species are selected - conservationally significant, vulnerable, indicators and/or characteristic for particular habitats. Also key species having essential significance for the ecosystems balance. Species with high potential for conflict with different users are included as well. The information is necessary to the Park Directorate for management purposes and to answer the questions: What is the populations' status in the NP? What are the trends? Is the species population in the park stable? Are the implemented management measures enough and efficient? Are the Management goals achieved? The conservation status of the species selected for monitoring is given in Appendix 4.

Note: The national statistics collects data annually for all hoofed species, the wolf, the bear, the wild cat, capercaillie, partridge; nocturnal birds of prey. Species chosen with priority for more extensive monitoring are presented here.</td>
</tr>
<tr><td colspan="9">BIG MAMMELS</td></tr>
<tr>
<td>*6. Chamois*</td>
<td>Number, population characteristics</td>
<td>In the entire park</td>
<td>Annually, constantly</td>
<td>NP methodology is under development</td>
<td>Field monitoring Data processing and analyses</td>
<td>Experts, consultants if necessary</td>
<td>For management needs. See above - Necessity</td>
<td>For NPD, NNPS, EEA Forms and electronic format data</td>
</tr>
<tr>
<td>*7. Red deer*</td>
<td>Number, population characteristics</td>
<td>In the entire park</td>
<td>Annually, constantly</td>
<td>There is no methodology developed</td>
<td>Field monitoring Data processing and analyses</td>
<td>Experts, consultants if necessary</td>
<td>For management needs. See above - Necessity</td>
<td>For NPD, NNPS, EEA Forms and electronic format data</td>
</tr>
</table>

9. Wolf	Number, population characteristics, damages caused to domestic animals	In the entire park	Annually, constantly	NP methodology is under development	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. See above - **Necessity**	For NPD, NNPS, EEA Forms and electronic format data

FISHES

27. Balkan trout	Number	The methodology will defined, with priority in the regions 1-6 chosen for complex monitoring	Annually	There is no methodology developed	Field monitoring Data processing and analyses	Experts, consultants if necessary	For management needs. Species status information; effect of the applied measures, norms and regimes for fishing.	For NPD, NNPS Forms and electronic format data
AMPHIBIANS AND REPTILES	Consultation with experts is necessary for selection of indicator species. According to NPD assessment 3 species are proposed here.	The methodology will define, with priority in the regions 1-6 chosen for complex monitoring	The methodology will define	There is no methodology developed	The methodology will define	The methodology will define	For management needs. See above - **Necessity.** They give quick information for changes, successions and trends. React quickly on habitats changes.	For NPD, NNPS Forms and electronic format data
28. Alpine newt	*It is not an object for monitoring in Pirin NP*							

				There is no methodology developed	The methodology will define и	The methodology will define	For management needs. See above - **Necessity** Conservation significant specie	For NPD, NNPS Forms and electronic format data
29. Viviparous lizard	The methodology will define	The methodology will define, with priority in the regions 1-6 chosen for complex monitoring	The methodology will define					
30. European tree-frog	The methodology will define	The methodology will define, with priority in the regions 1-6 chosen for complex monitoring	The methodology will define	There is no methodology developed	The methodology will define	The methodology will define	For management needs. See above - **Necessity** Conservation significant specie	For NPD, NNPS Forms and electronic format data
IINVERTABRATES	For selecting invertebrate indicator species consultation with experts is necessary. No approved unified methodology exists. There is a methodology used in CBNP during 1999 and 2000.	The methodology will define the areas, with priority in the regions 1-6 chosen for complex monitoring	The methodology will define	There is no methodology developed	Sample collection assistance	The methodology will defined BAS	For management needs. See above **Necessity.** They give quick information for changes, successions and trends. React quickly on habitats changes.	BAS to NPD, NNPS Forms and electronic format data

PLANTS

CONSERVATION SIGNIFICANT SPECIES	Number, cover, locality size, development stage, status	Localities with priority in the regions 1-6 chosen for complex monitoring; the single localities of the rarest species	Annually, Seasonally for most of the species	There is no methodology developed	Field monitoring Primary data processing and analyses	Experts, consultants if necessary	The following species groups are under monitoring– unique, rare, endangered, vulnerable species, species object of interest for collection from tourists or local population (attractive plants, medicinal plants) The requirements will be specific conserning species biology and ecology. As a whole the monitoring methods are equal.	For NPD, NNPS Forms and electronic format data
31.Rose root								
32. Yellow Gentian								
33. Dotted-flowered Gentian								
34. Rila Rhubarb	*It is not an object for monitoring in Pirin NP*							
35. Iris								
36. Edelweiss								
37. Balkan campion	*It is not an object for monitoring in Pirin NP*							
38. Yellow Lily								
39. Rhododendron								
40. Blagaev`s spurge	*It is not an object for monitoring in Pirin NP*							
41. Sundew								
42. Balkan primrose	*It is not an object for monitoring in Pirin NP*							
43. Vihren`s erigeron								
44. Banderica Lady`s mantle								
45. Pirin Poppy								
46. Pirin hogweed								

47. Stefan`s Hawkweed								
48. Pirin`s Thyme								
49. Urumov`s Oxytropis								
TOURISM								
51.Tourism flow	Number, tourists distribution	The methodology will define the areas, with priority in the regions 1-6 chosen for complex monitoring	Annually	There is no methodology developed	Field monitoring Primary data processing and analyses	Experts, consultants if necessary, volunteers, students	Aims to define the carrying capacity of the territory (limits of acceptable use) and limits of acceptable change in the intensive tourism regions. Should answer the questions _In what limits tourism and NP biodiversity conservation are compatible_	For NPD, NNPS Forms and electronic format data
52. Tourism impact Trails, Resting sites/View points Bivouacs, chalets, Lake and along lake habitats, rock habitats	The methodology is under development	The proposed areas should be defined. Covers the entire park, with priority in regions 1-6 chosen for complex monitoring.	Annually, constantly	The methodology is under development	Field monitoring Primary data processing and analyses	Experts, consultants if necessary, volunteers, students	See above	For NPD, NNPS Forms and electronic format data

VEGETATION COMMUNITIES, SUCCESIONS PROCESSES

				No methodology is approved	Field monitoring Primary data processing and analyses	Experts, consultants if necessary,		
54. Grazing impact	There is no methodology developed	The methodology will defined the areas, with priority in the regions 1-6 selected for complex monitoring	Annually				The information is necessary for defining the high mountain livestock husbandry significance for maintaining the biodiversity in grass and bush habitats. Should answer the question: *What do we do*? if the tendency of decreasing in the number of pasturing animals continues. For management needs.	For NPD, NNPS Forms and electronic format data

8.   Forms for submission of the ecomonitoring information to the Environmental Executive Agency by the NPD

The analyzed and summarized data of the NP monitoring results has to be submitted regularly to the EEA by the NPD and when necessary to NNPS in order to fill in the National Monitoring System. Due to the fact that there is no existing comprehensive biodiversity monitoring system so far neither for the NPs nor for the whole country, the EEA does not have forms for data collection or storage of summarized and analyzed information regarding the status of different species and habitats.

As a result of the annual monitoring activities the NPDs are going to receive significant amounts of information. Most of it is needed directly by the NPD for solving practical management tasks at National park level. Certain parts of the information gathered from the monitoring is going to be submitted regularly to the EEA in a coordinated format so that the Agency could exercise its obligations regarding the data storage for the status of the biodiversity at national level and in order to meet the obligations rising from diferent international Conventions and Directives. For particular monitoring components mainly abiotic (water, soils etc.), for which there are no sample points in the parks that are part of the national network so far, the information is going to supplement the data gathered from the rest sample taking points in the country. The points in the Parks are going to serve as control stations for registration of the status of these components in territories that are not exposed to direct negative impacts.

On the basis of the proposed monitoring methodologies of the selected objects in the parks, the EEA experts prepared proposals for forms for annual submission of the information gathered during the monitoring in the parks. These forms along with the methodologies have to be tested and if necessary to be supplemented and/or changed. The improved forms have to be included as foundation of a biodiversity monitoring electronic data base, which to be developed for the needs of the EEA for storing and fast and effective use of data gathered during the annual monitoring in the National Parks as well as other parts of the country.

The forms for annual submission of the summarized data from the NPD to EEA follow.

8.1 Information gathering form for the annual bear monitoring by the NP – to EEA

National Park ....

Year:

Prepared by :

№8 BEAR

PS - locality/ section/ subsection	Types of habitats	Availability of habitats from:			Number of bear observations in habitats from:			Number of print observations in habitats from:			Population by sex and age groups					Total number	Density - nr/1000 Hectares	Nr. Of registered couches and dens	Nr. Of observations of marking behavior	Number of encounters with humans
											male			female						
		I bonity	II bonity	III bonity	I bonity	II bonity	III bonity	I bonity	II bonity	III bonity	I Gr..- Nr.	II Gr..- Nr.	III Gr.. - Nr.	I Gr.- Nr.	II Gr.- Nr.					
	High mountain																			
	Mountain																			
	Low mountain																			
	High mountain																			
	Mountain																			
	Low mountain																			
	High mountain																			
	Mountain																			
	Low mountain																			
TOTAL FOR THE NP																				

8.2   Information gathering form for the annual night raptor and forest birds monitoring by the NP – to EEA

NP...   Year:
                                                                                            Prepared by:

HIGHT RAPTOR AND FOREST BIRDS - № 17, 18, 19, 20, 21, 22, 23, 24, 25, 26

Species	Presence in the park (Y/N)	Observation area: PS - locality/ Test plot/ itinerary	Number of birds per locality (токовище/ airy)	Particularities observed in the separate species, summarized for the year
№17 Tengmalm's Owl		1		
		2		
		Total For the NP		
№ 18 Eagle Owl		1		
		2		
		Total For the NP		
№19 Pygmy Owl		1		
		2		
		Total For the NP		
№20 Ural Owl		1		
		2		
		Total For the NP		
№21 Hazel Grouse		1		
		2		
		Total For the NP		
№22 Capercaillie		1		
		2		
		Total For the NP		
№23 Rock Partrige		1		
		2		
		Total For the NP		
№24 White-backed woodpecker		1		
		2		
		Total For the NP		
№25 Wallcreeper		1		
		2		
		Total For the NP		
№26 Yellow-billed Chough		1		
		2		
		Total For the NP		

8.3 Information gathering form for the annual raptor and forest birds monitoring by the NP – to EEA

NP..

Year:

Prepared by :

RAPTOR BIRDS - № 11, 12, 13, 14, 15, 16

Species	Area of observation: PS - locality/ test plot/ itinerary	Observed birds				nr. of nests	Nr. Nesting couples	nr. Of incubated juveniles	nr. Of brought juveniles	Particularities observed in the separate species, summarized for the year	Additional behavior information		
		Single birds		couples							Observed conjugal games (Y/N)	Observed prey hunting (Y/N)	observed seasonal migrations (Y/N)
		ad. - nr.	juv. - nr.	imm.. - nr.	ad. - nr.								
№11 Short-toed Eagle	1												
	2												
	3												
	Total For the NP												
№12 Long-legged Buzzard	1												
	2												
	3												
	Total For the NP												
№13 Golden Eagle	1												
	2												
	3												
	Total For the NP												

Species	Area of observation: PS - locality/ test plot/ itinerary	Observed birds				nr. of nests	Nr. Nesting couples	nr. Of incubated juveniles	nr. Of brought juveniles	Particularities observed in the separate species, summarized for the year	Additional behavior information		
		Single birds		couples							Observed conjugal games (Y/N)	Observed prey hunting (Y/N)	observed seasonal migrations (Y/N)
		ad. - nr.	juv. - nr.	imm.. - nr.	ad. - nr.								
№14 Saker Falcon	1												
	2												
	3												
	Total For the NP												
№15 Peregrine Falcon	1												
	2												
	3												
	Total For the NP												
№16 Imperial Eagle	1												
	2												
	3												
	Total For the NP												

8.4   Information gathering form for the annual souslik monitoring by the NP – to EEA

NP...   Year:

                                                                                                   Prepared by :

№10 SOUSLIK

PS - locality/ Section / subsection	Types of habitats*				area /ha/	Souslik presence				Relative number of the population	Relative density of the population	
	excellent	good	satisfactory	inadequate		Y/N	Nr. Of single animals	Nr. Single columns	Colony		nr. holes/ 1 ha	nr. of animals/ 1 ha
1.												
2.												
3.												
4.												
5.												
Total for the NP												

Types of habitats *

Excellent - dry, open locations with not too dense low herbal vegetation
Good – dry herbal areas, with rare juniper and dwarf-pine shrubs
Satisfactory – open areas with high and turfed grass, juniper and dwarf pine spot growing.
Inadequate – forest and dwarf- pine massifs; dense juniper, bilberries, fern, steep slopes, shallow soil and/ or over moisturized localities.

8.5   Information gathering form for the annual conservationally important vegetation species monitoring by the NP – to EEA

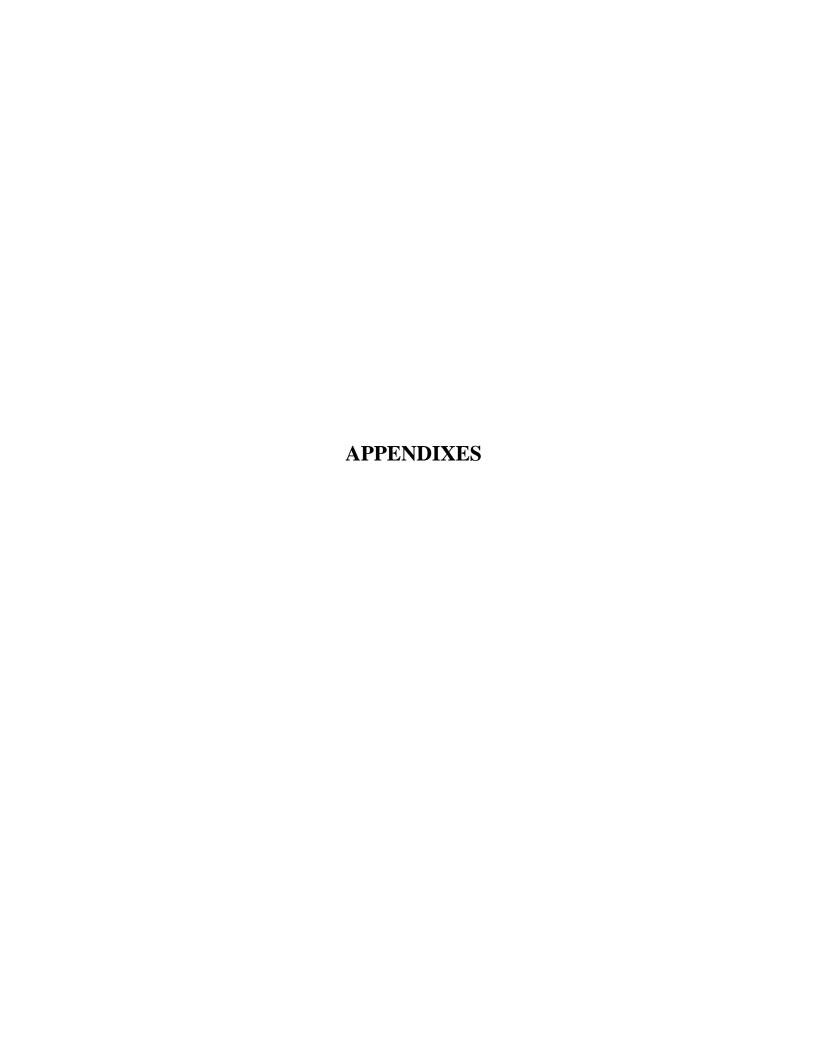NP..   Year:

Prepared by:

PLANTS – WITH CONSERVATION IMPORTANCE - №31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42

Species	PS - locality/ section/ subsection	localities		area of the locality (m²)	Density of the population - number/1m² or % projective cover	% blooming	% fructi- ferous	General condition of the locality*		
		population (yes/no)	single spesimens (yes – number /no)					good	satisfactory	bad
№31 Rose root (*Rhodiola rosea* L.)	1									
	2									
	3									
№32 Yellow gentian (*Gentiana lutea* L.)	1									
	2									
	3									
№33 Spotted gentian (*G. punctata* L.)	1									
	2									
	3									
№34 Rila rhubarb (*Rheum rhaponicum* L.)	1									
	2									
	3									
№35 Iris (*Iris reichenbachii* Heuff.)	1									
	2									
	3									

Species	PS - locality/ section/ subsection	localities		area of the locality (m²)	Density of the population - number/1m² or % projective cover	% blooming	% fructi- ferous	Condition of the locality*		
		population (yes/no)	single spesimens (yes – number /no)					good	satisfactory	bad
№36 Edelweiss (*Leontopodum alpinum* Cass.)	1									
	2									
	3									
№37 Balkan campion (*Silene balcanica* (Urum.) Hay.*)*	1									
	2									
	3									
№38 Yellow lily (*Lilium jankae* Kern)	1									
	2									
	3									
№39 Rhododendron (*Rhododendron myrtiphlium* Schott et Kotschy)	1									
	2									
	3									
№40 Blagaev`s spurge (*Daphne blagayana* Freyer*)*	1									
	2									
	3									
№41 Sundew (*Drosera rotundifolia* L.)	1									
	2									
	3									
№42 Vihren`s erigeron (*Erigeron uniflorus L. ssp. Vichreusus* (Pawl.) Koz. et Andr.)	1									
	2									
	3									

* Condition of the locality:

good – over 50 % fructiferous speciments

satisfactory - 50% young and 50% fructiferous, vegetation progress, normal blooming and fructiferity

bad - over 50% old non-fructiferous specimens, suppressed vegetation and seed reproduction

APPENDIXES

Appendix 1

<u>ARD - Bulgaria</u>
Biodiversity Conservation & Economic Growth Project
Sponsored by
USAID and the Government of Bulgaria

55 Parchevich Street, 3rd floor, 1000 Sofia   *tel./fax: (+359 2) 986 7418; 986 3686; 986 3846; 980 7240*

Monitoring System Development and Implementation in the National Parks

16 January 2003

Objectives:

- To present to NNPS and other relevant bodies of MOEW the National Park Monitoring system objectives, structure, content.
- To present the methodologies for monitoring developed and the fieldwork and training performed.
- To agree on actions/procedure for acceptance of the methodologies.
- To agree on next years financing of the monitoring activities.
- To agree on involvement of the RIEW and EEA in implementing the monitoring system – data collection and management.

Program

09:00 – 09:30	Opening of the WS. Participants presentation. Objectives and program presentation	P.Hetz
09:30 – 10:30	Presentation of the overall monitoring system for the NP – structure, content (where, what, how to monitor in the parks)	S. Todorov V. Ivanova
10:30 – 10:50	*Coffee brake*	
10:50- 11:20	Methodology for monitoring of the forests presentation.	G. Kostov
	Field work and training.	S. Mirchev
	Q&A	Park experts
11:20 – 11:40	Phenological monitoring methodology presentation	Ch. Gussev
	Field work and training	Park experts
	Q&A	
11:40- 12:00	Methodology for monitoring of birds presentation	B. Ivanov
	Q&A	Park experts

12:00 – 12:20	Methodology for monitoring of bear presentation	R. Gunchev
	Field work and training	Park experts
	Q&A	
12:30 – 13:30	Lunch	
13:30 – 13:50	Methodology for monitoring of suslik presentation	V. Stefanov
	Q&A	Park experts
13:50 – 14:20	Methodology for monitoring of the tourist impact presentation	D. Peev
	Q&A	
14:20 – 15:10	*Coffee brake*	
15:10 –16:10	The role of RIEW and EEA - Small groups discussion	
16:10 – 16:40	Reporting the results from the small groups discussion	
16:40 – 18:00	Action plan development for next steps on establishing and implementing the monitoring system - Discussion	D. Boteva
	Closing the WS	

Participants

NNPS
1. Christo Bojinov
2. Mihail Michaylov
3. Ivajlo Zafirov
4. Valeri Vulchinkov
5. Rajna Hardalova

EEA
6. Director/Deputy Director
7. Madlena Pavlova

RIEW
8. Plovdiv Director
9. Blagovgrad Director

NP Central Balkan
10. Nela Rachevits
11. Anton Stanchev
12. Gergana Staneva
13. Gencho Iliev
14. Svetoslav Todorov
15. Rumiana Ficheva
16. Petya Kovacheva

NP Rila
17. Vasil Petrov
18. Verka Ivanova
19. Krassimir Andonov
20. Tatyana Maleshevska
21. Rumen Kolchagov

NP Pirin

22. 1 expert

Authors of the Methodologies
23. Georgi Kostov
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33. Bojan Damianov (Translator)

Appendix 2

Development and Implementation of National Parks Ecological Monitoring System

Workshop – Environmental Executive Agency
20.02.2003, Sofia

Summary

Objectives:

- To confirm the objectives and purpose of the ecological monitoring system in the
  Bulgarian National Parks.
- To review questions and comments of NNPS and EEA concerning elements of the
  proposed ecological monitoring framework – both selected geographical areas, and
  selected species for monitoring.
- To develop operational, practical links between the RIEW and the Directorates of the
  National Parks, for monitoring of the abiotic elements in the Parks and to outline the
  next steps for their implementation.
- To outline further steps for implementation of the monitoring system including the rest
  of the selected monitoring objects in the monitoring matrices of each park.

Participants:
1. Krasimira Avramova - EEA
2. Ivanka Todorova – EEA
3. Svetoslav Cheshmedzhiev - EEA
4. Mihail Mihailov - NNPS
5. Ivailo Zafirov – NNPS
6. Nela Rachevitz - CBNP
7. Svetoslav Todorov –CBNP
8. Vasil Petrov – RNP
9. Verka Ivanova – RNP
10. Blagoi Klecherov – PNP
11. Ivailo Iconomov – PNP
12. Peter Hetz – BCEG Project
13. Dimitrina Boteva – BCEG Project

Discussion Results
Summary

1. EEA and NNPS expressed their satisfaction that the proposed for the National Parks Ecological Monitoring System answers the primary needs of a national biodiversity monitoring system and is a positive step towards contributing to a national model for all protected areas in the country. The proposed scheme was evaluated as a good framework that can be adapted and used in the evolving national biodiversity monitoring system at national level.

2. The individual efforts of RNP and CBNP Directorates to prepare ecological monitoring components and their presentation in monitoring matrices were evaluated as an important step towards accomplishment of their Management Plans objectives.

3. All participants confirmed that the Parks' Ecological Monitoring system serves a practical tool and that it addresses management tasks for each National Parks. Selected monitoring components will be included in a National monitoring system and the information will be submitted to EEA in a format to be specified by the Agency. Specific sample stations for several monitoring components (water, soil and etc.), will be added to the national monitoring network, as at present, no such sites exist in the National network. The stations in the Parks will serve as control stations. These stations will provide primary information fundamental to all ecological monitoring systems, and serve as control points for ecosystems and territory that has minimal direct, negative impacts or interference.

4. The Ecological Monitoring System for the three Parks should be unified in terms of "major components, methodologies, reporting formats, and periodicity. This must be developed at a practical level. The EEA and NNPS should be provided with detailed information on "how and what" information is collected in each of the Parks. Each National Park Directorate (NPD) will maintain and keep the basic (primary) information; the EEA will periodically receive reports.

5. Abiotic component monitoring (soils, rain, water quality). The RIEW will collect samples at prescribed points, provide laboratory analysis, data interpretation, and summarization. The National Park Directorates will provide assistance through Park Rangers during sample collection. The results of these monitoring efforts will be provided by the RIEW to the EEA and the Directorates.

6. Financing of the abiotic monitoring activities, which depend on RIEW/EEA assistance, are recommended to come from the budgets of the Park Directorates. These funds will be managed by NPD and will be reported against annual plans for monitoring of abiotic components in the parks. This money will be obligated by the NPDs to cover the costs of RIEW monitoring activities on each Park territory. Budgets will be developed, in the first instance, by the relevant RIEW and NPD as a joint activity. Subsequent budgets will be based on periodic reviews of methodology, analysis and costs.

7. Monitoring methodologies that have already been developed with the assistance of the BCEG Project, will be submitted to NPD, NNPS and EEA. Methodologies will be used on an experimental basis for 3-5 years in the national parks. If the efficiency and

applicability of the methodology is proved, the methodology will be approved through a final review and approval process at the MOEW.

8. The component "Heavy metal accumulation" as a separate monitoring component will be eliminated from the National Parks Ecological Monitoring Martix. This component is sufficiently covered as soil and rain monitoring and analysis. If deemed necessary, heavy metal accumulation tests will be conducted on concrete places and objects.

Planned activities

Activities	Dead line and responsible person
1. Develop a Protocol with the requirements of EEA for the monitoring components, their periodicity, and the monitoring result submission form from NPD to EEA.	20 March, Madlen Pavlova
2. Review the methodologies and instructions (developed with the assistance of the BCEG Project., and confirm the appropriate reporting formats that will be used and recognized by the EEA.	20 March, Madlen Pavlova
3. Add Soils, Rain, and water quality, and their exact collection methods, analysis parameters, periodicity, etc. to the Ecological Monitoring Matrix for the National Parks.	7 March, Madlen Pavlova
4. Organize working meetings between NPD, EEA and the corresponding RIEW to develop the program and organization of the abiotic components and samples sites for soil, rain and water quality for monitoring for each Park.	Indefinite EEA, NPD
5. Organize a working meeting between Rila NPD, EEA and INRNE for discussion on terms, ways and format for submitting the monitoring data from Musala Basic Ecological Laboratory from INRNE to NPD and EEA.	Indefinite EEA, "Rila" NPD
6. Develop status reports for each of the Parks for existing stations for rain quantity and quality estimation using information from IHM, BAS stations, and etc. The information will be submitted to EEA for review and a determination of what is necessary to assure data compilation and sharing for information needs of each NPD.	20 March NPD
7. 7.1. Develop a detailed description of the proposed monitoring regions in each park and provide a clear rationale and set of objectives for for including a variety of monitoring objects in each region. 7.2 Prepare a reference for each of the monitoring components for which there is no methodology developed. These remaining components will be prioritized in according to the needs of the NPD.	7 April NPD Dimitrina Boteva/BCEG

8. Provide a more detailed description of the methodologies developed with the assistance of the BCEG Project and recommendations for their requirements/conditions for assuring correct application of the methodologies in order to obtain reliable results.	12 March 7. Dimitrina Boteva
9. Format and submit the final version of the matrices and methodologies for ecological monitoring in the National parks to NPD, NNPS and EEA, developed under the BCEG Project.	30 April Dimitrina Boteva

Prepared by: D. Boteva
28.02.2003

Appendix 3

QUESTIONS
For discussion with EEA and NNPS on Development and Implementation of Ecological Monitoring System in the National Parks

With the review of Rila, Central Balkan and Pirin National Parks proposal for ecological monitoring matrices some questions were identified, which requires discussion and concrete decisions to be taken. These questions aim to open the discussion and to guide the preliminary preparation of the meeting on the 20 of February in EEA. We hope this will speed up the work and make the meeting more efficient.

The following problems requires your attention:

1. Levels of processing and storage of the collected information – according to the EEA and NNPS functions and activities and their experience in information gathering on a national scale – at what level do you see the summarization and analysis of the collected during the monitoring in the parks information? The different monitoring objects selected by NPD should be considered separately?

2. Which objects have to be monitored in the entire PA system in Bulgaria (for accomplishment of international conventions and directives for example)? Some of the selected objects for monitoring assure data for fulfilling direct management decisions and activities only on Park's level. It is necessary to define the objects/parameters for which EEA and NNPS requires information to be submitted for the national data storage.

3. For the data, which will go above the level "Park Directorate" and are necessary on national scale generalization, analysis and evaluation - what have to be the process for information flow and the necessary forms? Who and how will be engaged to develop a system for assuring unified flow of information?

4. What are the requirements of EEA and NNPS for the way of presenting the methodologies – format, content?

5. How are the methodologies going to be reviewed and agreed upon – the developed already methodologies and the once, which are going to be developed in future? Who will publish them?

6. When financing the monitoring activities in the parks with EEA and RIEW participation (samples collection, analysis, etc.) how to synchronize the scheme between the different departments for assuring the necessary budgets?

7. Meetings with RIEW – clarifying who, what and how monitor on the parks` territory? How will the process be organized and managed – EEA and NPD roles?

8. Monitoring of the abiotic parameters on national scale – who collects/were, how are the data generalized, analyzed and submitted? Where and how NPD can use such information for the specific parks` territory/ (How could be assured the regular data submission from Institute of Forestry, BAS and Nuclear Research and Energy Institute to the Park Directorates?).

9. In order to achieve compatibility for the forest monitoring, the developed methodology is using as a base the National system 16-km grid index. Is it necessary all the parameters of the16-km grid index to be included for full comparison with the National data? Is a change needed and what should it be for the data of the Forest Fund Forms, which are regularly submitted to the National Statistics Institute for the Parks territory?

10. Observing the heavy metals quantity – for monitoring goals of the National Parks, where should the test for heavy metals accumulation be made – in soil, in biological objects (plants/animals), other?

Appendix 4

Conservation significance and nature protection status of the selected for monitoring species

Species	Bern Convention	Biodiversity Act			Habitats Directive - Appendixes	Birds Directive - Appendixes	Bulgarian Red Book	IUCN Red List/
		App. II	App. III	App. IV				
Large mammals								
6. Chamois (*Rupicapra rupicapra balcanica*)	X	X		X	II, IV, V		Endangered Balkan endemic	
7. Deer (*Cervus elaphus*)								
8. Bear (*Ursus arctos*)	X	X	X		II, IV		Rare	
9. Wolf (*Canis lupus*)	X	X		X			Endangered	
Small mammals								
10. Souslik (*Spermophilus citellus*)	X	X			II, IV			
Diurnal birds of pray								
11. Short – toed Eagle (*Circaetus gallicus*)	X	X	X			I	Endangered	
12. Long – legged Buzzard (*Buteo rufinus*)	X	X	X			I	Endangered	
13. Golden Eagle (*Aquila chrysaetos*)	X	X	X			I	Rare	
14. Saker Falcon (*Falco cherrug*)		X	X			I	Endangered	
15. Peregrine Falcon (*Falco peregrinus*)	X	X	X			I	Endangered	
16. Imperial Eagle (*Aquila heliaca*)	X	X	X			I	Endangered	

Nocturnal birds of pray								
17. Tengmalm's Owl (*Aegolius funereus*)	X	X	X			I	Rare	
18. Eagle Owl (*Bubo bubo)*	X	X	X			I	Endangered	
19. Pygmy Owl (*Glaucidium passerinum)*	X	X	X			I	Extinct *	
20. Ural Owl (*Strix uralensis)*		X	X			I	Rare	
Forest birds								
21. Hazel Grouse (*Bonasa bonasia)*	X	X	X			I, II/2	Endangered	
22. Capercaillie (*Tetrao urogallus)*	X	X		X		I, II/2	Endangered	
23. Rock Partridge (*Alectoris graeca)*		X		X		II/1		
24. White – backed Woodpecker (*Picoides leucotos)*	X	X	X			I	Rare	
Rocky habitats birds								
25. Wallcreeper (*Tichodroma muraria)*		X	X					
26. Yellow-billed Chough (*Pyrrhocorax graculus)*		X	X					
Fish								
27. Balkan trout (*Salmo trutta-morfa fario*)								
Amphibias and Reptiles								
28. Alpine newt (*Triturus alpestris)*		X	X				Rare	
29. Viviparous lizard (*Lacerta vivipara)*			X					
30. Europeam tree frog (*Hyla arborea)*		X	X		IV			
Invertebrates								

Plants

Conservationally significant species

31. Rose root (*Rhodiola rosea*)								
32. Yellow gentian (*Gentiana lutea*)			X		V		Endangered	
33. Spotted gentian (*G. punctata*)			X				Endangered	
34. Rila rhubarb (*Rheum rhaponicum*)	X	X	X				Rare	
35. Iris (*Iris reichenbachii*)								
36. Edelweiss (*Leontopodum alpinum*)		X	X				Rare	
37. Balkan campion (*Silene balcanica*)								
38. Yellow lily (*Lilium jankae*)	X	X	X				Rare	
39. Rhododendron (*Rhododendron myrtiphlium*)							Rare	
40. Blagaev`s spurge (*Daphne blagayana*)			X				Rare	
41. Sundew (*Drosera rotundifolia*)							Rare	
42. Balkan primrose (*Primula frondosa*)			X				Rare, Bulgarian endemic	
43. Vihren`s erigeron (*Erigeron uniflorus*)								
44. Banderica Lady`s mantle (*Alchemilla bandericensis*)							Endangered, Bulgarian endemic	

45. Pirin poppy (*Papaver degenii*)			X				Rare, Bulgarian endemic	
46. Pirin hogweed (*Heracleum angustisectum)*							Rare, Bulgarian endemic	
47. Stefan`s hawkweed (*Hieracium stefanoffii)*							Rare, Bulgarian endemic	
48. Pirin`s thyme (*Thymus perinicus*)			X				Rare, Bulgarian endemic	
49. Uromov`s oxytropis (*Oxytropis urumovii)*							Rare, Bulgarian endemic	

* The Bulgarian Red Data Book has been published in 1985 and the information included in it is not up to date anymore. The species has been recorded in Rila and Central Balkan and other few places in the country later on.